Ε.Γ. ΣΤΥΛΙΑΡΗΣ - ΒΙΟΓΡΑΦΙΚΟ ΣΗΜΕΙΩΜΑ

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Ακαδημαϊκές Θέσεις

- **Από Οκτ/2001 - σήμερα**: Επίκουρος Καθηγητής στον Τομέα Πυρηνικής Φυσικής και Φυσικής Στοιχειωδών Σωματιδίων του Τμήματος Φυσικής του Πανεπιστημίου Αθηνών (Μονιμοποίηση 5/2005).

Μεταδιδακτορική Δραστηριότητα

- **1996 – 2001:** Επιστημονικός Συνεργάτης στο Πανεπιστημιακό Ερευνητικό Ινστιτούτο Επιταχυντικών Συστημάτων και Εφαρμογών (Ε.Π.Ι.Ε.Σ.Ε.). Για το χρονικό διάστημα Μάιος/1996 - Απρίλιος/1997 Κοινοτικός Υπότροφος με RETURN Fellowship στα πλαίσια του Προγράμματος Marie Curie. Από το 1998 Ερευνητής Γ΄.
- **1992 – 1995:** Επιστημονικός Συνεργάτης (Wissenschaftlicher Mitarbeiter) στο Deutsches Elektronen-Synchrotron DESY-Hamburg, Γερμανία. Συμμετοχή στην ερευνητική ομάδα Φυσικής Υψηλών Ενεργειών ZEUS. Για την χρονική περίοδο Δεκ/1992 έως Νοεμ/1994 Κοινοτικός Υπότροφος του Προγράμματος HUMAN CAPITAL and MOBILITY (Institutional Fellowship).
- **1990 – 1991:** Εκπλήρωση υποχρεωτικής στρατιωτικής θητείας. Παράλληλα επισκέπτης στο Εθνικό Κέντρο Ερευνών *ΔΗΜΟΚΡΙΤΟΣ*, Εργαστήριο Πυρηνικής Φυσικής (Tandem-Lab).
- **1989:** Μεταδιδακτορική Απασχόληση (Post-Doc) ενός έτους σαν Επιστημονικός Συνεργάτης (Wissenschaftlicher Mitarbeiter) στο Hahn-Meitner-Institute του Βερολίνου.

Εκπαίδευση

- **1985 – 1988:** PhD στην Πειραματική Πυρηνική Φυσική, Hahn-Meitner-Institute και Freie Universität Berlin, Γερμανία, με επιβλέποντα καθηγητή τον Prof. W. von Oertzen. Τίτλος Εργασίας: *Διάθλαση και το Φαινόμενο του Ουρανίου Τόξου στην Σκέδαση Βαρέων Ιόντων* (Βαθμός: magna cum laude)
- **1982 – 1984:** MSc στην Πειραματική Πυρηνική Φυσική, Hahn-Meitner-Institute και Freie Universität Berlin, Γερμανία. Τίτλος Εργασίας: *Μέτρηση της Ενέργειας Σύνδεσης και Φασματοσκοπία του Εξωτικού Πυρήνα* ^{57}Cu (Βαθμός: sehr gut)
- **1976 – 1981:** Πτυχίο Φυσικής (Βαθμός: Άριστα) του Αριστοτελείου Πανεπιστημίου Θεσσαλονίκης

ΕΡΕΥΝΗΤΙΚΟ ΕΡΓΟ

ΠΡΟΣΦΑΤΗ ΕΡΕΥΝΗΤΙΚΗ ΔΡΑΣΤΗΡΙΟΤΗΤΑ

Τα τρέχοντα ερευνητικά ενδιαφέροντα, όπως αυτά διαμορφώθηκαν τα τελευταία έτη, εστιάζονται κυρίως στις παρακάτω κατηγορίες:

(α) Καινοτομική έρευνα στην περιοχή της Πυρηνικής Ιατρικής για την ανάπτυξη και βελτιστοποίηση ανιχνευτικών απεικονιστικών διατάξεων Μονοφωτονικής Τομοσπινθηρογραφίας (γ-Camera, SPECT) μικρού πεδίου αλλά υψηλής διακριτικής ικανότητας για ιατρική και ραδιοφαρμακευτική έρευνα.

- Ανάπτυξη τομοσπινθηρογραφικού φορητού συστήματος γ-Camera υψηλής ευαισθησίας και διακριτικής ικανότητας για κλινική χρήση, βασισμένο σε χωρικά ευαίσθητο φωτοπολλαπλασιαστή και διακριτοποιημένους κρυστάλλους σπινθηρισμού.
- Μελέτη της απόδοσης ομογενών κρυστάλλων σπινθηρισμού σε σπινθηρογραφική απεικόνιση και ανάπτυξη των αντίστοιχων αλγορίθμων ανακατασκευής της προβολικής εικόνας, απαλλαγμένης από βαρελοειδείς παραμορφώσεις.
- Βελτίωση της αντίστοιχης οργανολογίας λήψης και ανάλυσης σημάτων από φωτοπολλαπλασιαστές με πληροφορία θέσης (position sensitive photomultiplier) μέσω της τεχνικής διαίρεσης φορτίου και χρήσης γρήγορων ψηφιοποιητών, βασισμένων σε τεχνολογία PCI.
- Ανάπτυξη νέων τεχνικών ανακατασκευής τομογραφικής εικόνας βασισμένων στην επιτάχυνση συνήθων επαναληπτικών αλγεβρικών αλγορίθμων (Algebraic Reconstruction Techniques) με αριθμητικές μεθόδους και σε Τεχνητά Νευρωνικά Δίκτυα (Artificial Neural Networks) με ενσωμάτωση σύγχρονων ηλεκτρονικών επεξεργαστών (Field Programmable Gate Arrays).
- Μελέτες Monte Carlo βασισμένες στον κώδικα προσομοίωσης GEANT4 του CERN κάνοντας χρήση της λογισμικής επιφάνειας GATE (Geant4 Application for Tomographic Emission) με σκοπό την μελέτη της επίδρασης του φαινομένου Compton στο σχεδιασμό του κατευθυντήρα και γενικότερα στην οργανολογική βελτίωση της απεικονιστικής διάταξης.

(β) Ενεργός συμμετοχή στα πειράματα Αδρονικής Φυσικής της μελέτης του συντονισμού Δ+(1232) που διεξήχθησαν στο Ερευνητικό Κέντρο του Γραμμικού Επιταχυντή Ηλεκτρονίων M.I.T.-Bates (Massachusetts, USA) και στο Mainz-Microtron (MAMI) της Γερμανίας. Μελέτη της ηλεκτροδιέγερσης του συντονισμού Δ+(1232) μέσω της αντίδρασης $H(e,e'p)\pi^0$ με μετρήσεις εξαιρετικής ακρίβειας στο σύστημα φασματογράφων OOPS (Out-Of-Plane-Spectrometer) και στους φασματογράφους της κοινοπραξίας A1.

Ανάπτυξη στατιστικής μεθόδου βασισμένης σε τεχνικές Monte-Carlo για την ανάλυση πειραματικών μετρήσεων και τον ανεξάρτητο υποκείμενου μοντέλου προσδιορισμό των κυρίαρχων πλειονοπόλων στην διεργασία της ηλεκτροδιέγερσης. Προσδιορισμός και εξαγωγή των ευαίσθητων πλειονοπόλων από τις μετρηθείσες συναρτήσεις απόκρισης και μελέτη της επίδρασης του υποβάθρου στον χαρακτηρισμό του συστήματος. Επιτυχής εφαρμογή της μεθόδου αυτής στην εξαγωγή διεγερμένων αδρονικών καταστάσεων και σε δεδομένα πλέγματος (Lattice QCD).

ΠΡΟΣΦΑΤΕΣ ΟΜΙΛΙΕΣ
ΣΥΜΜΕΤΟΧΗ ΣΕ ΔΙΕΘΝΗ ΣΥΝΕΔΡΙΑ ΚΑΙ ΑΛΛΑ ΙΔΡΥΜΑΤΑ

University of Cyprus, Department of Physics
15 April 2011
Optimized Techniques for High Resolution SPECT Imaging
(Invited Talk)

Nuclear Science Symposium – Medical Imaging Conference, IEEE-2009
25-31 October 2009, Orlando, Florida, USA
An Analytical Position Correction Algorithm for γ-Camera Planar Images from Resistive Chain Readouts
An Accelerated Algebraic Reconstruction Technique based on the Newton-Raphson Scheme
Collimator Study of a γ-Camera System using GATE
(Poster Presentations)

LINKSCEEM Users Meeting
Athens, 9 February 2009
Medical Imaging with High Performance Computers
(Invited Talk)

Nuclear Science Symposium – Medical Imaging Conference, IEEE-2008
19-25 October 2008, Dresden, Germany
A New Position Reconstruction Method for Position Sensitive Photomultipliers
(Poster Presentation)

Annual Congress of the European Association of Nuclear Medicine, EANM 2008
12-15 October 2008, Munich, Germany
Position Reconstruction from Multi-Anode Photomultiplier Signals
Correcting Spatial Distortion and non-Uniformity in Planar Images from γ-Camera Systems
(Poster Presentations)

LINKSCEEM 1st Users Meeting
The Cyprus Institute, 8 April 2008
Medical Imaging: Emission Tomography at the IASA SPECT-Lab
(Invited Talk)

University of Cyprus, Department of Physics
5 July 2007
A Model Independent Analysis Scheme: Extraction of Multipole Amplitudes in the Nucleon Resonance Region
(Invited Talk)

PET-SPECT-Radio Isotopes in Greece, Workshop
General Secretary of Research & Development Hellas, Athens, 26 June, 2006
SPECT Imaging Development
(Invited Talk)

Oncology Center (BOCOC), Cyprus
9 June, 2006
The SPECT Research Program of IASA
(Invited Talk)

International Workshop on the "SHAPE OF HADRONS"
27-29 Apr, 2006 Athens, Greece
Multipole Extraction: Sensitivities and Model Errors
(Invited Talk)

HADRON DEFORMATION WORKSHOP
M.I.T. Stata Center, LNS, Cambridge, MA, USA, 7-9 August, 2004
$\gamma^* N \rightarrow \Delta$ *Bates Results*
E. Stiliaris for the OOPS Collaboration
(Invited Talk)

International Workshop on Parity Violation and Hadronic Structure (PAVI04)
Laboratoire de Physique Subatomique et de Cosmologie, Grenoble, FRANCE, 8-11 June 2004
Parity Violation in Nuclear Systems: Experimental Considerations in the Deuteron Photodisintegration with Polarized Photons
(Invited Talk)

Electromagnetic Interactions with Nucleons and Nuclei (EINN03)
Workshop on Nucleon Form Factors and Parity Violation
Athens & Santorini (GREECE), 6-12 October 2003
Study of the Parity-Non-Conserving (PNC) Force between Nucleons with Low Energy Beams
(Invited Talk)

ΛΟΙΠΗ ΕΡΕΥΝΗΤΙΚΗ ΔΡΑΣΤΗΡΙΟΤΗΤΑ

- Τακτικό μέλος της Επιστημονικής και Οργανωτικής Επιτροπής του Διεθνούς Συνεδρίου *Imaging Technologies in Biomedical Sciences (ITBS)*. Guest Editor των Πρακτικών του παραπάνω συνεδρίου για τα έτη 2003 και 2007:

Proceedings of the 2nd International Conference on Imaging Technologies in Biomedical Sciences (ITBS03):

"Recent Advances in Detectors and Techniques for Clinical and Experimental Nuclear Imaging"

Editors: E. Auffray (CERN), P. Lecoq (CERN), J. Maublant (Clermont-Ferrand, FR) and E. Stiliaris (University of Athens & IASA, GR)

Nuclear Instruments & Methods **A 527** (2004)

4th International Conference on Imaging Technologies in Biomedical Sciences (ITBS07):

"From Medical Images to Clinical Information – Bridging the Gap"

Editors: R. Itti (Lyon, FR) and E. Stiliaris (University of Athens & IASA, GR)

Journal of Instrumentation
http://iopscience.iop.org/1748-0221/focus/extra.proc2

- Co Editor in the refereed Proceedings Volume of the 3rd Workshop on:

"From Parity Violation to Hadronic Structure and more..." (PAVI 2006),
Editors: K. de Jager, S. Kox, D. Lhuillier, F. Maas, S. Page, C. Papanicolas, E. Stiliaris, J. Van de Wiele
The European Physical Journal A - Hadrons and Nuclei
Volume 32, Number 4, Springer Verlag 2007.

- Κριτής στα περιοδικά *Nuclear Instruments and Methods A* (ELSEVIER), *Journal of Instrumentation* (IoP), *Artificial Intelligence in Medicine* (ELSEVIER) and *Computers in Biology and Medicine* (ELSEVIER).

- Τακτικό μέλος του Institute of Electrical and Electronics Engineers (IEEE) – Nuclear Science and Plasma Physics, της Ένωσης Ελλήνων Φυσικών και της Εταιρείας Πυρηνικής Φυσικής στην Ελλάδα, της οποίας διατέλεσε δύο φορές μέλος του Δ.Σ. (ταμίας).

ΠΡΟΗΓΟΥΜΕΝΗ ΕΡΕΥΝΗΤΙΚΗ ΔΡΑΣΤΗΡΙΟΤΗΤΑ ΚΑΙ ΕΜΠΕΙΡΙΑ

Θεμελιακή Έρευνα στην Πυρηνική Φυσική με επιταχυντές ηλεκτρονίων. Ειδικότερα, μελέτη της παραβίασης της ομοτιμίας στην αλληλεπίδραση νουκλεονίων όπως αυτή εκφράζεται στην ασυμμετρία της φωτοδιάσπασης του δευτερίου $d(\gamma,n)p$ με πολωμένα φωτόνια. Σχεδιασμός σύγχρονων πειραμάτων ακριβείας μέτρησης της ασυμμετρίας με χρήση πολωμένης δέσμης ηλεκτρονίων χαμηλής ενέργειας (3-10 MeV). Συμμετοχή σε παράλληλες δραστηριότητες της ερευνητικής ομάδας του Thomas Jefferson National Accelerator Facility (Virginia, USA) και συνεργασία με την αντίστοιχη ομάδα διεξαγωγής πειραμάτων ακριβείας για την μελέτη της παραβίασης της ομοτιμίας του Πανεπιστημίου του Mainz (Γερμανία) με σκοπό την βελτίωση της σχετικής οργανολογίας:

- Παραγωγής πολωμένης δέσμης ηλεκτρονίων υψηλού ρεύματος
- Βελτίωσης του συντελεστή απόδοσης κυκλικά πολωμένων φωτονίων κατά την διεργασία Bremsstrahlung
- Σχεδιασμού ανιχνευτικής διάταξης μέτρησης νετρονίων για τον προσδιορισμό της ασυμμετρίας στην φωτοδιάσπαση του δευτερίου.
- Ανάπτυξης και βελτίωσης διαγνωστικών συστημάτων δέσμης ηλεκτρονίων για την ελαχιστοποίηση του υπεισερχόμενου συστηματικού σφάλματος.

Παράλληλα, ενεργός συμμετοχή στις δραστηριότητες της τελικής φάσης λειτουργίας (commissioning) του γραμμικού επιταχυντή ηλεκτρονίων, ενέργειας 10MeV, στο Ινστιτούτο Επιταχυντικών Συστημάτων και Εφαρμογών, για την υλοποίηση του προαναφερθέντος ερευνητικού προγράμματος.

<u>Ερευνητική Δραστηριότητα στο Ι.Ε.Σ.Ε. 1995-2001</u>

Υπεύθυνος της εγκατάστασης της πλήρους διάταξης του γραμμικού επιταχυντή ηλεκτρονίων CW ενέργειας 10MeV. Μελέτη της οπτικής του επιταχυντή με την βοήθεια προγραμμάτων προσομοίωσης (TRANSPORT, PARMELA) [C7, C19]. Προσδιορισμός και επιλογή των κατάλληλων διαγνωστικών για την επίτευξη ποιοτικής δέσμης υψηλών προδιαγραφών. Μελέτη και σχεδιασμός της αρχιτεκτονικής του Συστήματος Αυτομάτου Ελέγχου βασισμένο στο σύστημα ελέγχου EPICS (Experimental Physics and Industrial Control System).

- Επιτυχής εγκατάσταση και λειτουργία της θερμιονικής πηγής ηλεκτρονίων (e-gun) καθώς και της γραμμής των Chopper-Buncher των 100 keV [C12, C13].

- Υλοποίηση του συστήματος Αυτομάτου Ελέγχου στη γραμμή των 100keV του επιταχυντή βασισμένο στο σύστημα EPICS σε VME-bus επεξεργαστές σημάτων και Real-Time λειτουργικό VxWorks [C9,C10]. Ανάπτυξη λογισμικού για την ολοκλήρωση νέων μονάδων αναλογικών σημάτων εισόδου / εξόδου στο σύστημα EPICS. Αρχιτεκτονική σχεδίαση του πλήρους συστήματος ελέγχου του τελικού επιταχυντή ηλεκτρονίων τύπου Microtron.

- Ανάπτυξη διαγνωστικών σάρωσης της δέσμης (wire scanners) με το αντίστοιχο σύστημα καταγραφής και ανάλυσης δεδομένων βασισμένο σε σύστημα CAMAC.

- Μέτρηση των χαρακτηριστικών της δέσμης των ηλεκτρονίων 100-keV με την βοήθεια των διαγνωστικών σάρωσης (wire scanners) και υπολογισμός του

εγκάρσιου φασικού χώρου (transverse emittance) [C13, C18]. Ανάπτυξη μεθόδου εκτίμησης του εγκάρσιου φασικού χώρου με χρήση νευρωνικών δικτύων [C20].

- Σχεδιασμός και εγκατάσταση της διάταξης του CW-Linac τελικής ενέργειας 10MeV στο κτίριο του Ι.Ε.Σ.Ε. [C19] με πλήρη μικροκυματική τροφοδοσία [C14]. Σχεδιασμός και υλοποίηση του πλήρους Συστήματος Αυτομάτου Ελέγχου και Συστήματος Προστασίας Προσωπικού βασισμένο σε Programmable Logic Controllers (PLCs) και VME-bus ηλεκτρονικά [C21].

Συμμετοχή στο ερευνητικό πρόγραμμα αξιοποίησης της δέσμης ηλεκτρονίων για την παραγωγή δευτερογενών ακτινοβολιών (Smith-Purcell). Θεωρητική εκτίμηση της εκπομπής ακτινοβολίας Smith-Purcell βασισμένη σε προγράμματα Monte Carlo και μελέτη εγκατάστασης ανιχνευτικής συσκευής μέτρησής της στον πειραματικό χώρο του Ι.Ε.Σ.Ε. [C15-C17].

Συμμετοχή στο ερευνητικό πρόγραμμα Πυρηνικής Ιατρικής για την ανάπτυξη ανιχνευτικής απεικονιστικής διάταξης SPECT (γ-camera) υψηλής διακριτικής ικανότητας για ιατρική και ραδιοφαρμακευτική έρευνα [J44]. Βελτίωση της αντίστοιχης οργανολογίας λήψης και ανάλυσης σημάτων από φωτοπολλαπλασιαστές με πληροφορία θέσης (position sensitive photomultiplier) και ανάπτυξη τρισδιάστατης απεικονιστικής τεχνολογίας με περιστρεφόμενη τράπεζα δειγμάτων [P8, P12, P13].

Σχεδίαση και κατασκευή θαλάμου προσομοίωσης συνθηκών ανώτερης ατμόσφαιρας (μέσης και ανώτερης τροπόσφαιρας) για τον έλεγχο αξιοπιστίας οζοντοβολίδων και την βαθμονόμηση οργάνων (Πρόγραμμα συνεργασίας με το Εθνικό Αστεροσκοπείο Αθηνών) [R11]. Κατασκευή και εγκατάσταση του ηλεκτρονικού συστήματος αυτομάτου ελέγχου της πίεσης και της θερμοκρασίας του θαλάμου.

<u>ZEUS Collaboration 1992-1995</u>

Συμμετοχή στην Ερευνητική Ομάδα Υψηλών Ενεργειών του Πειράματος ZEUS στον επιταχυντή ηλεκτρονίων-πρωτονίων του ερευνητικού κέντρου DESY στο Αμβούργο της Γερμανίας. Πειραματική μελέτη της σκέδασης του ηλεκτρονίου πάνω σε πρωτόνια και των συναφών διεργασιών (Deep Inelastic Scattering, Photoproduction) και αναζήτηση Εξωτικών Καταστάσεων της ύλης [J9 – J11, J13 – J16, J18 – J43].

Υπεύθυνος της ομάδας ανάλυσης δεδομένων (off-line analysis & reconstruction) και του λογισμικού προσομοίωσης του ανιχνευτή (Monte-Carlo). Ανάλυση των πειραματικών δεδομένων 1992-1994 στα πλαίσια της ομάδας “Hadronic Final States”.

- Ανάπτυξη λογισμικού απεικόνισης πραγματικών δεδομένων σε διαφορετικά συστήματα συντεταγμένων χρησιμοποιώντας μετασχηματισμούς Lorentz και διάφορους αλγόριθμους προσδιορισμού Jets [P3].

- Οργάνωση και επιμέλεια του λογισμικού ανάλυσης δεδομένων με την βοήθεια του πακέτου CMZ και ανάπτυξη αυτόματου μηχανισμού κατανομής του και εγκατάστασης σε ετερογενή υπολογιστικά συστήματα [R4].

- Προσομοίωση τμημάτων του ανιχνευτή σε περιβάλλον GEANT και ποιοτικός έλεγχος του καλοριμέτρου.

Hahn-Meitner Institute 1982-1989

Εμπειρία στον τομέα της Πειραματικής Πυρηνικής Φυσικής Βαρέων Ιόντων σε Χαμηλές και Μεσαίες Ενέργειες. Τα ερευνητικά ενδιαφέροντα εστιάζονται στα ακόλουθα:

- Ακριβής προσδιορισμός του πυρηνικού δυναμικού μεταξύ Βαρέων Ιόντων μέσω της πειραματικής μετρήσεως του φαινομένου του *Ουρανίου Τόξου* στην ελαστική σκέδαση (Rainbow Scattering) [J6,J17].

- Παραγωγή και φασματοσκοπία *Εξωτικών Πυρήνων* μέσω πυρηνικών αντιδράσεων μεταφοράς (transfer reactions) με αστροφυσικές εφαρμογές [J2,J3].

- Μελέτη της διεργασίας *Ανταλλαγής Φορτίου* (Charge Exchange) σε αντιδράσεις Βαρέων Ιόντων στην ενεργειακή περιοχή 10 – 100 MeV/u [J1,J4,J5,J12].

- Πυρηνική φασματοσκοπία μέσω αντιδράσεων μεταφοράς Βαρέων Ιόντων [J7,J8].

Συμμετοχή σε πειράματα που διεξήχθησαν στα ακόλουθα Επιταχυντικά Ερευνητικά Κέντρα της Ευρώπης: Στον επιταχυντή VICKSI (Tandem-Cyclotron accelerator) του Hahn-Meitner-Institute, Berlin, του γραμμικού επιταχυντή βαρέων ιόντων UNILAC στο GSI-Darmstadt της Γερμανίας και στον επιταχυντή GANIL (Cyclotron-Cyclotron combination) Caen της Γαλλίας.

Πρώτη Μεταδιδακτορική Περίοδος 1989

Υπεύθυνος (spokesman) του πειράματος R20 με τίτλο "*Διαθλαστική Σκέδαση Βαρέων Ιόντων*" στο Hahn-Meitner-Institute, Berlin. Μετρήσεις της ελαστικής σκέδασης του συστήματος $^{16}O+^{16}O$ σε μεγάλες γωνίες και επαλήθευση της δομής Airy στην γωνιακή κατανομή.

Περίοδος Εκπόνησης Μεταπτυχιακών (MSc-PhD) 1982-1988

Υπεύθυνος λειτουργίας του μαγνητικού φασματογράφου Q3D στον επιταχυντή βαρέων ιόντων VICKSI του Ινστιτούτου Hahn-Meitner στο Βερολίνο:

- Ανάπτυξη πειραματικής μεθόδου φασματοσκοπίας ασταθών πυρήνων βασισμένης στην κινηματική αντιδράσεων 2- και 3-σωματιδίων μέσω της ανάλυσης της ορμής του σκεδαζόμενου σωματιδίου με την βοήθεια του μαγνητικού φασματογράφου. Μέτρηση της ενέργειας σύνδεσης και των ενεργειακών σταθμών του εξωτικού πυρήνα ^{57}Cu [J2] (διπλός μαγικός πυρήνας ^{56}Ni + p) με αστροφυσικές συνέπειες στο φαινόμενο της νουκλεοσύνθεσης (rapid hydrogen burning, rp-process).

- Πρώτες πειραματικές ενδείξεις για την ύπαρξη του υπερνετρονικού πυρήνα ^{9}He με ταυτόχρονη μέτρηση της ενέργειας σύνδεσής του [J3]. Σύγκριση των πειραματικών τιμών με μακροσκοπικά και μικροσκοπικά μοντέλα πρόβλεψης ελλείμματος πυρηνικής μάζας (mass excess prediction models).

- Μελέτη της διαθλαστικής σκέδασης Βαρέων Ιόντων σε ενέργειες πάνω από το δυναμικό Coulomb και προσπάθεια μέτρησης του πυρηνικού δυναμικού σε μικρές αποστάσεις με το φαινόμενο του *Ουρανίου Τόξου* (Rainbow Scattering). Πρώτες ενδείξεις για διαθλαστική σκέδαση σε Βαρέα Ιόντα με εμφανή δομή Airy στο

σύστημα $^{16}O+^{16}O$ [6]. Σύγκριση του φαινομένου με το σύστημα $^{20}Ne+^{12}C$ και λεπτομερής ανάλυση διαφόρων φαινομενολογικών και μικροσκοπικών μοντέλων πρόβλεψης πυρηνικών δυναμικών [J17].

- Μελέτη και υλοποίηση θεωρητικού μοντέλου περιγραφής της ελαστικής σκέδασης Βαρέων Ιόντων βασισμένο στην ημικλασική θεώρηση της σκέδασης με μιγαδικές τροχιές. Προσπάθεια επεξήγησης της εμφανιζόμενης δομής Airy στα πειραματικά αποτελέσματα [J6].

- Ανάλυση πειραματικών δεδομένων πυρηνικών αντιδράσεων ανταλλαγής φορτίου με Βαρέα Ιόντα ($^{12}C,^{12}N$), ($^{13}C,^{13}N$) και των συναφών διεργασιών μεταφοράς νουκλεονίων στην ενεργειακή περιοχή 10-100 MeV/u στα πλαίσια συνεργασίας με το κέντρο GANIL. Διερεύνηση της ενεργειακής εξάρτησης του μηχανισμού συναρτήσει της άμεσης ανταλλαγής φορτίου (one step process) και της μεταφοράς νουκλεονίων (two-step process) [J1,J4,J5,J12].

- Προσπάθεια κατανόησης του μηχανισμού μεταφοράς νουκλεονίων σε αντιδράσεις Βαρέων Ιόντων (nuclear transfer reactions) σε ενέργειες πάνω και κάτω του δυναμικού Coulomb [J7,J8].

<u>Τεχνική Εμπειρία:</u> Οπτική μαγνητικού φασματογράφου Q3D υψηλής διευκρινιστικής ανάλυσης καθώς και πυρηνικά ανιχνευτικά συστήματα βασισμένα σε ηλεκτρονικά NIM και CAMAC.

- Ανάπτυξη μεθόδου διόρθωσης της οπτικής του φασματογράφου 2ου και 3ου βαθμού, βασισμένη σε πειραματικές μετρήσεις (Time-of-Flight) και προσομοιώσεις (Raytrace) [R1].

- Υπεύθυνος της ομάδας για την Offline ανάλυση των πειραματικών δεδομένων. Δημιουργία συστήματος φιλτραρίσματος-συμπίεσης δεδομένων (data reduction - event compression algorithm) για συντομότερη επεξεργασία δεδομένων [R2].

- Ανάπτυξη συστήματος συλλογής δεδομένων του ανιχνευτικού συστήματος του φασματογράφου (focal plane detector) σε περιβάλλον CAMAC.

ΔΙΔΑΚΤΙΚΟ ΕΡΓΟ

ΤΜΗΜΑ ΦΥΣΙΚΗΣ ΠΑΝΕΠΙΣΤΗΜΙΟΥ ΑΘΗΝΩΝ, Οκτ. 2001-σήμερα

(α) Ανάληψη Μαθημάτων

	ΜΑΘΗΜΑ	ΕΞΑΜΗΝΟ
1.	Εισαγωγή στην Πυρηνική Φυσική και τα Στοιχειώδη Σωμάτια	ΣΤ΄
2.	Πυρηνική Φυσική Ι	Ζ’
3.	Εργαστήρια Πυρηνικής Φυσικής	ΣΤ΄
4.	Εργαστήρια Κατεύθυνσης Πυρηνικής	Ζ’
5.	Πειραματικές Μέθοδοι Φυσικής ΙΙ	Μεταπτυχιακό
6.	Εργαστήρια Φυσικής Ι	Α’
7.	Εργαστήρια Φυσικής ΙΙ	Β’
8.	Εργαστήρια Φυσικής ΙΙΙ	Γ’

(β) Κύρια Επιμέλεια Μεταπτυχιακών και Διπλωματικών Εργασιών

Εκπόνηση Διδακτορικής Διατριβής (PhD)

	ΤΙΤΛΟΣ ΕΡΓΑΣΙΑΣ	ΟΝΟΜΑ	ΕΤΟΣ ΚΑΤΑΘΕΣΗΣ
3.	Συνεισφορά της Οπτικής Τομογραφίας OCT (Optical Computed Tomography) στην Μονοφωτονική Τομοσπινθγρογραφία	Α.-Ν. Ραψομανίκης	Σε εξέλιξη
2.	Κατασκευαστική Μελέτη Πρωτότυπης Compton-Camera για Μονοφωτονικές Τομισπινθηρογραφήσεις	Μ. Μικέλη	Σε εξέλιξη
1.	Ανάπτυξη Τομοσπινθηρογραφικού Συστήματος SPECT Υψηλής Ευαισθησίας και Διακριτικής Ικανότητας	Δ. Θανασάς	2010

Μεταπτυχιακό Δίπλωμα Ειδίκευσης (Μ.Δ.Ε.)

	ΤΙΤΛΟΣ ΕΡΓΑΣΙΑΣ	ΟΝΟΜΑ	ΕΤΟΣ ΚΑΤΑΘΕΣΗΣ
5.	Τεχνικές Ανακατασκευής Τομογραφικής Εικόνας βασισμένες σε Αλγόριθμους με χρήση του Κριτηρίου Μέγιστης Πιθανοφάνειας	Ι. Μενής	Σε εξέλιξη

4.	Ανακατασκευή Προβολικής Εικόνας Συστήματος γ-Camera με Χρήση Ομογενών Κρυστάλλων Σπινθηρισμού	Μ. Μικέλη	2010
3.	Μελέτη Ομογενών, Διακριτοποιημένων και Ημι-Διακριτοποιημένων Κρυστάλλων Σπινθηρισμού	Α. Πολυχρονοπούλου	2008
2.	Σχεδιασμός και Κατασκευή Απεικονιστικής Διάταξης Ακτινοβολίας γ για Τομογραφικές Εφαρμογές Τύπου SPECT	Β. Σπανουδάκη	2003
1.	Χρήση Τεχνητών Νευρωνικών Δικτύων στην Απεικονιστική Τεχνολογία SPECT	Π. Πασχάλης	2003

Διπλωματικές Εργασίες

	ΤΙΤΛΟΣ ΕΡΓΑΣΙΑΣ	ΟΝΟΜΑ	ΕΤΟΣ ΚΑΤΑΘΕΣΗΣ
25.	Τεχνικές Ανακατασκευής Τομογραφικής Εικόνας στην Εκπομπή Ποζιτρονίου.	Α. Νικοπούλου (2005-161)	Σε εξέλιξη
24.	Σχεδιασμός & Μελέτη Εξειδικευμένης Τομογραφικής Συσκευής Τύπου PET για Απεικονίσεις Μαστού.	Σ. Αποστολοπούλου (2006-009)	Σε εξέλιξη
23.	Σύγκλιση και Ποιότητα Ανακατασκευής στην Επαναληπτική Αλγεβρική Τομογραφία.	Ε. Λεονδή-Στέϊσου (2000-148)	2011
22.	Εστιακές Ιδιότητες Κατευθυντήρα Παραλλήλων Οπών Συστήματος γ-Camera	Μ. Σωτηρίου (2007-240)	2011
21.	Προσομοιώσεις των Μεταβολών Θερμικής Ροής Νετρονίων σε Πυρήνα Αντιδραστήρα (Σε Συνεργασία με Ε.Κ.Ε.Φ.Ε. *ΔΗΜΟΚΡΙΤΟΣ*)	Ν. Χρυσανθοπούλου (2003-264)	2011
20.	Μελέτη ενός Νέου Τύπου Κατευθυντήρα για Τομοσπινθηρογραφική Απεικόνιση Βασισμένη σε Προσομοιώσεις GEANT4/GATE	Χ. Σαμπάτη (99214)	2011
19.	Επαναληπτικοί Αλγόριθμοι Ανακατασκευής Τομογραφικής Εικόνας με Απορροφητική Διόρθωση	Ι.-Δ. Στυλιάρη (Α.Μ. 2003-228)	2009
18.	Μελέτη Επαναληπτικών Αλγορίθμων Ανακατασκευής Τομογραφικής Εικόνας από Δεδομένα Προσομοιώσεων GEANT4	Α. Δασκαλάκη (Α.Μ. 2000-065)	2009
17.	Επίδραση των Γεωμετρικών Χαρακτηριστικών Κατευθυντήρα στην Λήψη Προβολικών Εικόνων Συστήματος γ-Camera: Μελέτη βασισμένη σε Προσομοιώσεις GEANT4/GATE	Μ. Αναστασιάδου (Α.Μ. 2005-273)	2009
16.	Μελέτη της Διακριτικής Ικανότητας Τομοσπινθηρογραφικού Συστήματος Μαστογραφίας μέσω Προσομοιώσεων GEANT4/GATE	Ι. Μπέης (Α.Μ. 2002-160)	2009
15.	Μία Νέα Μέθοδος Επιτάχυνσης και Βελτίωσης Αλγεβρικής Ανακατασκευής Τομογραφικής Εικόνας	Σ. Αγγελή (Α.Μ. 2004-288)	2008
14.	Αυτόματος Έλεγχος της Θερμοκρασίας Ψύξης των Μικροκυματικών Κοιλοτήτων	Α. Μιχαλοπούλου (Α.Μ. 2000-178)	2008

	του 10 MeV Γραμμικού Επιταχυντή του ΙΕΣΕ με PID Ελεγκτές		
13.	*Απορροφητική Διόρθωση Φωτονίων με Ιχνηθέτηση Διαφόρων Συστάσεων στην Τομογραφική Εκπομπή Ποζιτρονίων*	Γ. Χαντζόπουλος (Α.Μ. 2000-300)	2008
12.	Μελέτη της Επίδρασης των Γεωμετρικών Χαρακτηριστικών Κατευθυντήρα στην Ευαισθησία και Διακριτική Ικανότητα Πειραματικής γ-Camera	Μ. Μικέλη (Α.Μ. 2001-382)	2007
11.	Προσομοιώσεις Απλών Τομογραφικών Τεχνικών SPECT και PET με τη Βοήθεια του Προγράμματος GATE (Geant4 Application for Tomographic Emission)	Α. Γεωργαντζόγλου (Α.Μ. 2001-029)	2007
10.	Μελέτη των Χαρακτηριστικών Κατευθυντήρα σε γ-Camera με το Πρόγραμμα Προσομοίωσης GEANT/Gate	Ι. Κυριακίδου (Α.Μ. 2002-293)	2007
9.	Ανακατασκευή Τομογραφικής Εικόνας βασισμένη σε Επαναληπτικούς Αλγόριθμους με χρήση του Κριτηρίου Μέγιστης Πιθανοφάνειας	Χ. Παπούλιας (Α.Μ. 99189)	2007
8.	*Σύστημα Λήψεως Δεδομένων γ-Απεικονιστικής Διάταξης με Υψηλής Ταχύτητας PCI-Ψηφιοποιητές*	Γ. Κουτελιέρης (Α.Μ. 2000-311)	2006
7.	Σχεδιασμός και Μελέτη Συστήματος Λήψεως Δεδομένων γ-Απεικονιστικής Διάταξης με Ηλεκτρονικά CAMAC	Λ. Ραγκούσης (Α.Μ. 2000-241)	2006
6.	Μελέτη και Βελτίωση Απεικονιστικής Διάταξης Ακτινοβολίας-γ για Τομογραφικές Εφαρμογές Τύπου SPECT	Α. Πολυχρονοπούλου (Α.Μ. 2000-234)	2005
5.	Επαναληπτικοί Αλγόριθμοι στην Ανακατασκευή Τομογραφικής Απεικόνισης	Ν. Δικαίος (Α.Μ. 2000-076)	2004
4.	Ανακατασκευή Προβολικής Εικόνας στην Μονοφωτονική Τομοσπινθηρογραφία	Λ. Σούμα (Α.Μ. 98223)	2004
3.	Σχεδιασμός και Ανάπτυξη Αυτόματης Συσκευής Χαρτογράφησης Μαγνητικών Πεδίων	Ε. Πουρνάρας (Α.Μ. 99336)	2004
2.	Αυτόματος Έλεγχος του RF Συστήματος Χαμηλής Ισχύος του Επιταχυντή Ηλεκτρονίων του ΙΕΣΕ με Βηματικούς Κινητήρες	Δ. Τσιρίγκας (Α.Μ. 98247)	2003
1.	Τομογραφική Απεικόνιση με Χρήση Νευρωνικών Δικτύων	Χ. Τσούμπας (Α.Μ. 98251)	2002

(γ) Μέλος Τριμελών Επιτροπών Μεταπτυχιακών

	ΤΙΤΛΟΣ ΕΡΓΑΣΙΑΣ	ΟΝΟΜΑ	ΚΥΡΙΟΣ ΕΠΙΒΛΕΠΩΝ	ΕΤΟΣ
9.	Αλληλεπιδράσεις Νετρίνων και Βαθμονόμηση Φωτοπολλαπλασιαστών για το Πείραμα MINERvA	Σ. Αγγελιδάκης	Χ. Κουρκουμέλη	2010

	(Μ.Δ.Ε.)			
8.	Μικροσκοπική Μελέτη της S_0 Υπερ-ρευστότητας Νετρονίων στην Νετρονική Ύλη (Μ.Δ.Ε.)	Γ. Παύλου	Ε. Μαυρομμάτη-Φούντου	2010
7.	Διάδοση Φορτισμένων και Ουδετέρων Σωματιδίων σε Νανοκρυσταλλικές Δομές (Μ.Δ.Ε.)	Σ. Σάρρος	Χ. Τρικαλινός	2009
6.	Ανάπτυξη Προτύπου Τομογράφου Ποζιτρονίων (PET) (Διδακτορική Διατριβή)	Χ. Παφίλης	Γ. Τζανάκος	Σε εξέλιξη
5.	Μελέτη Ταλαντώσεων Νετρίνων στο Πείραμα MINOS (Διδακτορική Διατριβή)	Π. Σταμούλης	Γ. Τζανάκος	Σε εξέλιξη
4.	Μελέτη, Ανάλυση και Επανασχε-διασμός του Συστήματος Λήψης Δεδομένων του Πειράματος CMS (Διδακτορική Διατριβή)	Χ. Παπαδημη-τρόπουλος	Π. Σφήκας	2007
3.	Χρήση των Ανιχνευτών Micromegas για ένα νέο Απεικονιστικό Σύστημα (Μ.Δ.Ε.)	Μ. Λεμπέση	Ν. Γιόκαρης	2004
2.	Φυσική Νετρίνων (Μ.Δ.Ε.)	Π. Σταμούλης	Γ. Τζανάκος	2002
1.	Μελέτη του Συστήματος Μεταφοράς Δέσμης Ηλεκτρονίων στον 10 MeV C.W. Linac του Ι.Ε.Σ.Ε (Μ.Δ.Ε.)	Χ. Καπετάνιος	Κ. Παπανικόλας	2002

(δ) Λοιπές Διδακτικές Δραστηριότητες

Συμμετοχή στο πρόγραμμα διδασκαλίας του μεταπτυχιακού προγράμματος εκπαίδευσης της Διεθνούς Επιτροπής Ατομικής Ενέργειας (ΔΕΑΕ-IAEA). Διδασκαλία εισαγωγικών κεφαλαίων Πυρηνικής Φυσικής για τα έτη 2007, 2009 και 2011:

Postgraduate Education Course in Radiation Protection and the Safety of Radiation Sources (PGEG)
http://www-ns.iaea.org/training/details.asp?id=540

ΔΙΔΑΚΤΙΚΟ ΕΡΓΟ ΣΕ ΛΟΙΠΑ ΙΔΡΥΜΑΤΑ

- Εθνικό Μετσόβιο Πολυτεχνείο (Ε.Μ.Π.), Εαρινό Εξάμηνο 2000: Εργαστήρια Φυσικής της Σχολής Εφαρμοσμένων Μαθηματικών & Φυσικών Επιστημών (Σ.Ε.Μ.Φ.Ε.). Θέση Έκτακτου Διδακτικού Προσωπικού (Π.Δ. 407/80) σε βαθμίδα Επίκουρου Καθηγητή.

- Ι.Ε.Σ.Ε. 1998: Οργάνωση θερινών μαθημάτων-εργαστηρίων με πρακτική εξάσκηση με θέμα: "*Σύγχρονα Συστήματα Αυτομάτου Ελέγχου και Συλλογής Δεδομένων*"

- Hahn-Meitner-Institute, 1984-1988: Κύκλος σεμιναρίων με θέμα: "*Πειραματική Πυρηνική Φυσική με Βαρέα Ιόντα*" (2 ώρες εβδομαδιαίως).

Επίβλεψη Λοιπών Μεταπτυχιακών και Διπλωματικών Εργασιών:

- **M. Braeunig**: *Proton Stripping induced by ^{13}C at 50 MeV/Nucleon on ^{12}C, ^{40}Ca and ^{58}Ni*, MSc thesis, Fachbereich Physik, FU Berlin, 1989 (in German), (Επιβλέπων Καθηγητής W. von Oertzen)

- **D. Kolbert**: *Mass Measurement and Spectroscopy of Exotic Nuclei with Multi-Nucleon Transfer Reactions*, Dissertation, Fachbereich Physik, FU Berlin, 1989 (in German), (Επιβλέπων Καθηγητής W. von Oertzen)

- **Ν. Σπαρβέρης**: *Μελέτη της Οπτικής της Γραμμής των 5 MeV για το Microtron του Ι.Ε.Σ.Ε*, Διπλωματική Εργασία, Τμήμα Φυσικής Πανεπιστημίου Αθηνών, Τομέας Πυρηνικής και Σωματιδιακής Φυσικής, Αθήνα 1996, (Επιβλέπων Καθηγητής Κ.Ν. Παπανικόλας)

- **Ε. Μεϊντάνης**: *Εκτίμηση του εγκάρσιου φασικού χώρου δέσμης ηλεκτρονίων 100 keV με χρήση νευρωνικών δικτύων*, Διπλωματική Εργασία, Τμήμα Φυσικής Πανεπιστημίου Αθηνών, Τομέας Πυρηνικής και Σωματιδιακής Φυσικής, Αθήνα 1999, (Επιβλέπων Καθηγητής Κ.Ν. Παπανικόλας)

- **Κ. Στεφανίδου**: *Σχεδίαση και κατασκευή θαλάμου προσομοίωσης συνθηκών ανώτερης ατμόσφαιρας – Έλεγχος πίεσης*, Διπλωματική Εργασία, Τμήμα Φυσικής Πανεπιστημίου Αθηνών, Τομέας Εφαρμογών, Αθήνα 2000, (Επιβλέπων Καθηγητής Δ. Ασημακόπουλος)

- **Μ. Χατζάκη**: *Σχεδίαση και κατασκευή θαλάμου προσομοίωσης συνθηκών ανώτερης ατμόσφαιρας – Έλεγχος θερμοκρασίας*, Διπλωματική Εργασία, Τμήμα Φυσικής Πανεπιστημίου Αθηνών, Τομέας Εφαρμογών, Αθήνα 2000, (Επιβλέπων Καθηγητής Δ. Ασημακόπουλος)

- **Β. Σπανουδάκη**: *Μελέτη της Διακριτικής Ικανότητας γ-Κάμερας SPECT Υψηλής Ευκρίνειας*, Διπλωματική Εργασία, Τμήμα Φυσικής Πανεπιστημίου Αθηνών, Τομέας Πυρηνικής και Σωματιδιακής Φυσικής, Αθήνα 2001, (Επιβλέπων Καθηγητής Κ.Ν. Παπανικόλας)

ΥΠΟΤΡΟΦΙΕΣ

- **1976 - 1981:** Υπότροφος του Ι.Κ.Υ. για το διάστημα των βασικών σπουδών στο Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης.

- **1986:** Υποτροφία ανταλλαγής επιστημονικού δυναμικού (PROCOPE) διάρκειας ενός μηνός για την υποστήριξη ερευνητικών δραστηριοτήτων στο κέντρο GANIL (Caen) της Γαλλίας.

- **Δεκ/1992 – Νοεμ/1994:** Διετής Κοινοτική Υποτροφία του Προγράμματος HUMAN CAPITAL and MOBILITY (DESY Institutional Fellowship) για την υποστήριξη των ερευνητικών δραστηριοτήτων στην ομάδα Φυσικής Υψηλών Ενεργειών ZEUS.

- **Μάιος/1996 – Απρ/1997:** Κοινοτική Υποτροφία ενός χρόνου (RETURN Fellowship) στα πλαίσια του προγράμματος Marie Curie για την υποστήριξη των ερευνητικών δραστηριοτήτων στο Ι.Ε.Σ.Ε. με θέμα «Control System Implementation at the IASA Microtron».

- **Δεκ/1997:** Υποτροφία ανταλλαγής D.A.A.D. για την επίσκεψη του Ερευνητικού Κέντρου DESY (Hamburg) της Γερμανίας.

ΧΡΗΜΑΤΟΔΟΤΙΚΑ ΠΡΟΓΡΑΜΜΑΤΑ

Συμμετοχή στα παρακάτω Χρηματοδοτικά Προγράμματα Ενίσχυσης Έρευνας

Project	ΠΡΟΓΡΑΜΜΑ ΕΝΙΣΧΥΣΗΣ ΤΟΥ ΕΡΕΥΝΗΤΙΚΟΥ ΔΥΝΑΜΙΚΟΥ ΠΕΝΕΔ-2005
Title	Ανάπτυξη τομοσπινθηρογραφικού συστήματος SPECT υψηλής ευαισθησίας και διακριτικής ικανότητας.
Responsible	Ε. Στυλιάρης
Budget	60.000 €
Funding Body	Γενική Γραμματεία Έρευνας & Τεχνολογίας
Exploitation of Results	Το προτεινόμενο έργο αποσκοπεί στην ανάπτυξη ενός τομοσπινθηρο-γραφικού συστήματος SPECT (Single Photon Emission Computerized Tomography) με ανιχνευτή θέσης υψηλής ευαισθησίας και διακριτικής ικανότητας, το οποίο θα είναι κατάλληλο να χρησιμοποιηθεί για: (α) την μελέτη ραδιοφαρμάκων σε μικρά ζώα, (β) την απεικόνιση άκρων του ανθρωπίνου σώματος και (γ) την πρώιμη ανίχνευση καρκίνου του μαστού. Το συγκεκριμένο έργο εισάγει και αξιοποιεί τεχνολογίες αιχμής, όπως ανιχνευτών ακτίνων γ με χωρικά ευαίσθητους φωτοπολλαπλασιαστές (PSPMTs), σύγχρονων ηλεκτρονικών διατάξεων συλλογής και επεξεργασίας σήματος και τέλος αλγορίθμων σύνθεσης και ανακατασκευής εικόνας. Η καινοτομίες που εισάγονται στη λήψη των δεδομένων μέσω διαύλου PCI ενός κοινού προσωπικού υπολογιστή, καθιστούν την κατασκευή ευέλικτη στην μετακίνηση, εύκολη στην εγκατάσταση σε οποιονδήποτε κλινικό χώρο και χαμηλή στο κόστος κατασκευής.

Project	JOINT RESEARCH AND TECHNOLOGY PROGRAMMES CZECH-GREECE (2005-2007)
Title	Three-dimensional dosimetry using experimental and computer simulation methods for the quality assurance of contemporary radiation therapy applications.
Responsible	L. Sakelliou
Budget	20.000 €
Funding Body	General Secretariat of Research and Technology
Exploitation of Results	Employment of three-dimensional dosimetry methods for the development of quality control protocols as part of the quality assurance of contemporary radiation therapy techniques (Intensity modulated radiation therapy – IMRT, Gamma Knife stereotactic radiosurgery, brachytherapy as monotherapy or intravascular therapy).

Project	JOINT RESEARCH AND TECHNOLOGY PROGRAMMES Hellenic-Oukranian Co-Operation (2005-2007)
Title	Development of High Resolution Imaging System γ-Camera for the localization of cancer tumors.
Responsible	A. Karabarbounis
Budget	25.000 €
Funding Body	General Secretariat of Research and Technology
Exploitation of Results	Study of the optical photon transport inside the scintillation crystals. Full simulation and characterization of the optical properties in homogeneous, pixelated and semi-pixelated scintillators for γ-Camera imaging devices.

Project	JOINT RESEARCH AND TECHNOLOGY PROGRAMMES Hellenic-France Co-operation (2000-2002)
Title	Development of High Resolution Imaging System γ-Camera for the localization of Cancer Tumors.
Responsible	N. Giokaris
Budget	36.000 €
Funding Body	General Secretariat of Research and Technology
Exploitation of Results	Development of a small field, high resolution γ-Camera system for the evaluation of radiopharmaceuticals in small animals and other phantom studies.

Project	JOINT RESEARCH AND TECHNOLOGY PROGRAMMES Hellenic-Romanian Co-Operation (1999-2001)
Title	Free Electron Laser (FEL) based on the Smith-Purcell effect.
Responsible	A. Karabarbounis
Budget	10.000 €
Funding Body	General Secretariat of Research and Technology
Exploitation of Results	Realization and design of a Detection System for the Smith Purcell effect and analytical calculation of a triangular grid and Monte Carlo prediction for experiments in a quadratic grid.

ΟΡΓΑΝΩΣΗ ΣΥΝΕΔΡΙΩΝ

Σειρά Διεθνών Συνεδρίων ITBS (Imaging Technologies in Biomedical Sciences)

Τακτικό μέλος της Διεθνούς Οργανωτικής Επιτροπής και βασικό μέλος της Τοπικής Οργανωτικής Επιτροπής. Κύριος Οργανωτής των συνεδρίων ITBS-2003 & ITBS-2007. Οι σκοποί της σειράς των συνεδρίων αυτών και η αντίστοιχη έκδοση των πρακτικών αναφέρονται στα παρακάτω.

The International Conference on *Imaging Technologies in Biomedical Sciences (ITBS)* is held every two years on the Milos Island, located in the southwest corner of the Cyclades Islands in Greece. The main aim of this Conference Series is to develop cross-fertilization between different disciplines and to attract in a same place medical doctors, medical physicists and physics detector experts as well as industrial partners to discuss about needs and improvements to be made in a variety of subjects of the Nuclear Imaging Technologies in the Biomedical Sciences.

	Date	Conference Title	Proceedings
ITBS01	May 20-24, 2001	*Detectors for PET, SPECT, Radiology and for in vitro Imaging*	
ITBS03	May 26-30, 2003	*Recent Advances in Detectors and Techniques for Clinical and Experimental Nuclear Imaging*	NIMA 527 (2004) 1-231 Editors: E. Auffray, P. Lecoq, J. Maublant, E. Stiliaris
ITBS05	September 25-29, 2005	*Innovation in Nuclear and Radiological Imaging: From Basic Research to Clinical Application*	NIMA 569 (2006) 153-662 Editors: B. Knoop, K. Nikita
ITBS07	September 22-28, 2007	*From Medical Images to Clinical Information – Bridging the Gap*	JINST Proceedings Editors: R. Itti, E. Stiliaris
ITBS09	September 13-16, 2009	*From Physiology and Cellular Biology to Pathology through Imaging*	To be published in JINST Editors: M. Goris, D. Maintas, A. Todd-Pokropek

Σειρά Διεθνών Συνεδρίων EINN (Electromagnetic Interactions with Nucleons and Nuclei)

Τακτικό μέλος της Τοπικής Οργανωτικής Επιτροπής των workshops, τα οποία προηγούνται της κύριας σειράς. Οι σκοποί της σειράς των συνεδρίων αυτών αναφέρονται στα παρακάτω.

The European Research Conference Series on *Electromagnetic Interactions with Nucleons and Nuclei (EINN)* focuses on recent results in the physics of hadrons and nuclei, emphasising studies of their internal quark-gluon structure. Recent measurements using electromagnetic and other probes are discussed in the light of theoretical and phenomenological analyses as well as lattice QCD studies. The aim of these series is to have fruitful discussions involving experimentalists and theorists with a background in nuclear and particle physics as well as in Hadron Physics. Young physicists are especially encouraged to attend and present a talk or poster.

The EINN Conference Series started in year 1995 on the Santorini Island (Cyclades, Greece) and it was initially supported by the ESF Research Conferences Scheme. The Conference is held every two years, the last three events (2005-2009) hosted on the Milos Island. No proceedings are produced in order to encourage the exchange of frank and even tentative information.

Τίτλος Συνεδρίου	The XXIV International Conference on Neutrino Physics and Astrophysics
Τόπος-Χρόνος	Megaron Athens, International Conference Center June 14-16, Athens, Greece
Ρόλος	Μέλος της Τοπικής Οργανωτικής Επιτροπής
	Local Organising Committee Theodoros Alexopoulos (NTU Athens) Efstratios Anassontzis (Athens) Fotis Diakonos (Athens) George Fanourakis (Demokritos) Dimitris Fassouliotis (Athens) Costas Foudas (Ioannina / Imperial) Evangelos Gazis (NTU Athens) Niki Saoulidou (Fermilab) Stathis Stiliaris (Athens) Nikolaos Tetradis (Athens) George Tzanakos (Athens) (Chair) George Voulgaris (Athens)
Web-Address	http://www.neutrino2010.gr/

Τίτλος Συνεδρίου	The 3rd International Workshop "From Parity Violation to Hadronic Structure and more..."
Τόπος-Χρόνος	Milos Conference Center *G. Eliopoulos* 16-20 May, 2006 Milos Island, Greece
Ρόλος	Chair of the Organizing Committee
	Organising Committee Kees de Jager (JLab) Serge Kox (LPSC Grenoble) David Lhuillier (DAPNIA Saclay) Frank Maas (IPN Orsay) Costas N. Papanicolas (Univ. of Athens & IASA) Shelley Page (Univ. of Manitoba) Efstathios Stiliaris (Univ. of Athens & IASA, Chair) Jacques Van de Wiele (IPN Orsay)
Web-Address	http://www.iasa.gr/PAVI06/

Τίτλος Συνεδρίου	Workshop on the “Shape of Hadrons”
Τόπος-Χρόνος	University of Athens 27-29 April, 2006 Athens, Greece
Ρόλος	Μέλος της Τοπικής Οργανωτικής Επιτροπής
	Local Organising Committee Andreas Karabarbounis Christos Ktorides (Chair)

	Nikolaos Sparveris Eustathios Styliaris Antonis Tsapalis
Web-Address	http://www.iasa.gr/hadrons/

Τίτλος Συνεδρίου	16th Hellenic Symposium on Nuclear Physics
Τόπος-Χρόνος	Physics Department, University of Athens May 26-27, 2006, Athens
Ρόλος	Μέλος της Τοπικής Οργανωτικής Επιτροπής
	Οργανωτική Επιτροπή Ε. Μαυρομμάτη Α. Καραμπαρμπούνης Ε. Στυλιάρης Ν. Σπαρβέρης Α. Τσάπαλης
Web-Address	http://conferences.phys.uoa.gr/hnps/

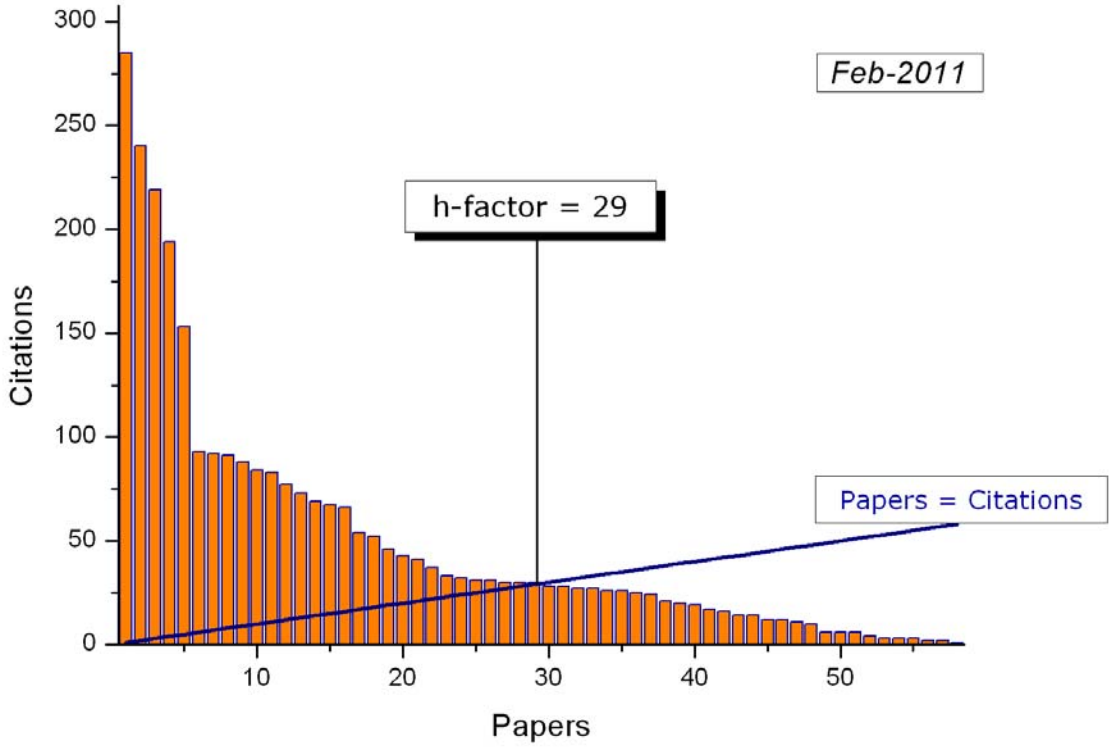
Τίτλος Συνεδρίου	The 20th International Workshop on Weak Interactions and Neutrinos (WIN'05)
Τόπος-Χρόνος	European Cultural Center of Delphi June 6-11, 2005, Delphi, Greece
Ρόλος	Μέλος της Τοπικής Οργανωτικής Επιτροπής
	Local Organising Committee Theodoros Alexopoulos (NTUA) George Fanourakis (Demokritos) Dimitris Fassouliotis (UoA) Niki Saoulidou (Fermilab) Efstathios Styliaris (UoA) George Tsipolitis (NTUA) George Tzanakos (UoA) (Chair)
Web-Address	http://conferences.phys.uoa.gr/win05/

Τίτλος Συνεδρίου	The 2000 CERN Accelerator School Basic Course on General Accelerator Physics
Τόπος-Χρόνος	Poseidon Hotel, Loutraki 2-13 October, 2000, Loutraki, Greece
Ρόλος	Μέλος της Τοπικής Οργανωτικής Επιτροπής
	C. Kourkoumeli (Chair) The 2000 CERN Accelerator School (Basic Course on General Accelerator Physics) was held on 2-13 October, 2000, in Loutraki, Greece. This event was co-organized by the CERN AC Division and IASA and was supported by several EU and UNESCO scholarships. The CERN Accelerator School holds training courses for accelerator physicists and engineers twice a year. The courses take place in conference centres in different member states of CERN and consist of a programme of lectures and tutorials spread over a period of one or two weeks. Participants are welcome from member states of CERN and other countries world-wide.
Web-Address	http://cas.web.cern.ch/cas/

CITATION INDEX (Feb-2011)

	Cited Work	Volume	Page	Year	Hits
[1]	J. Physique	C 47	175	1986	2
[2]	Z. Phys. A ATOMIC NUCLEI	326	139	1987	17
[3]	Z. Phys. A ATOMIC NUCLEI	330	227	1988	19
[4]	Nucl. Phys. A	488	C89	1988	12
[5]	Phys. Lett. B	218	299	1989	20
[6]	Phys. Lett. B	223	291	1989	88
[7]	Nucl. Phys. A	519	631	1990	4
[8]	Phys. Rev. C	44	1081	1991	6
[9]	Phys. Lett. B	303	183	1993	28
[10]	Phys. Lett. B	306	158	1993	21
[11]	Phys. Lett. B	306	173	1993	66
[12]	Nucl. Phys. A	555	455	1993	24
[13]	Z. Phys. C PART. FIELDS	59	231	1993	31
[14]	Phys. Lett. B	315	481	1993	285
[15]	Phys. Lett. B	316	207	1993	14
[16]	Phys. Lett. B	316	412	1993	240
[17]	Z. Phys. A ATOMIC NUCLEI	346	189	1993	33
[18]	Phys. Lett. B	322	287	1994	83
[19]	Z. Phys. C PART. FIELDS	63	391	1994	219
[20]	Phys. Lett. B	332	228	1994	93
[21]	Phys. Lett. B	338	483	1994	43
[22]	Z. Phys. C PART. FIELDS	65	379	1995	194
[23]	Z. Phys. C PART. FIELDS	65	627	1995	25
[24]	Phys. Lett. B	342	417	1995	46
[25]	Phys. Lett. B	345	576	1995	91
[26]	Phys. Lett. B	346	399	1995	27
[27]	Phys. Lett. B	348	665	1995	77
[28]	Phys. Lett. B	349	225	1995	41
[29]	Phys. Lett. B	350	120	1995	92
[30]	Z. Phys. C PART. FIELDS	67	81	1995	16
[31]	Z. Phys. C PART. FIELDS	67	93	1995	52
[32]	Phys. Lett. B	354	163	1995	30
[33]	Phys. Lett. B	356	129	1995	69
[34]	Phys. Lett. B	356	601	1995	84
[35]	Z. Phys. C PART. FIELDS	67	227	1995	26
[36]	Phys. Lett. B	363	201	1995	37
[37]	Phys. Rev. Lett.	75	1006	1995	30
[38]	Z. Phys. C PART. FIELDS	68	29	1995	31
[39]	Z. Phys. C PART. FIELDS	68	569	1995	3
[40]	Z. Phys. C PART. FIELDS	69	39	1995	73
[41]	Z. Phys. C PART. FIELDS	69	607	1996	153
[42]	Phys. Lett. B	369	55	1996	67
[43]	Z. Phys. C PART. FIELDS	70	1	1996	32
[45]	Nucl. Instrum. Meth. A	487	365	2002	11
[46]	Appl. Radiat. Isotopes	58	501	2003	27
[47]	Phys. Lett. B	564	21	2003	30
[48]	Phys. Rev. C	67	058201	2003	12
[50]	Phys. Med. Biol.	49	271	2004	28
[51]	Phys. Rev. Lett.	94	022003	2005	54

[52]	Nucl. Instrum. Meth. A	550	305	2005	1
[53]	Phys. Med. Biol.	50	4371	2005	6
[54]	Eur. Phys. J. A	24	175	2005	3
[55]	Phys. Med. Biol.	51	2101	2006	6
[56]	Phys. Rev. Lett.	97	212001	2006	10
[57]	Eur. Phys. J. A	30	471	2006	26
[58]	Phys. Lett. B	651	102	2007	14
[59]	Phys. Rev. C	78	018201	2008	2
[60]	Phys. Rev. C	78	025209	2008	3
	TOTAL				**2877**



IMPACT FACTOR

JOURNAL	PUBLICATIONS	IMPACT FACTOR*	TOTAL
Appl. Radiat. Isotopes	1	1.114	1.114
Eur. Phys. J. A	2	2.015	4.030
J. Physique	1	1.773	1.773
Nucl. Instr. and Meth. A	3	1.019	3.057
Nucl. Phys. A	3	1.959	5.877
Phys. Lett. B	24	4.034	96.816
Phys. Med. Biol.	3	2.784	8.352
Phys. Rev. C	4	3.124	12.496
Phys. Rev. Lett.	3	7.180	21.540
Z. Phys. A – Hadrons & Nuclei	3	1.626	4.878
Z. Phys. C – Particles & Fields	12	3.164	37.968
	59		197.901

(*) Όπως υπολογίζεται στο *ISI Web of Knowledge*, Journal Citation Reports (2008 JCR Science Edition)

List of Publications

Journal Papers

J62. P. Bourgeois *et al.*, OOPS Collaboration:
Measurements of the generalized electric and magnetic polarizabilities of the proton at low Q^2 using the virtual Compton scattering reaction,
Phys. Rev. C **84** (2011) 035206

Abstract: Experimental details of a virtual Compton scattering (VCS) experiment performed on the proton at the MIT-Bates out-of-plane scattering facility are presented. The VCS response functions $P_{LL} - P_{TT}/\varepsilon$ and P_{LT} have been measured at Q^2 = 0.057 GeV$^2/c^2$. The generalized electric and magnetic polarizabilities, $\alpha(Q^2)$ and $\beta(Q^2)$, and the mean-square electric polarizability radius $\langle r^2_\alpha \rangle$ are obtained from a dispersion analysis of the data. The results are in good agreement with $O(p^3)$ heavy baryon chiral perturbation and indicate the dominance of mesonic effects in the polarizabilities.

J61. J.M. Kirkpatrick *et al.*, OOPS Collaboration:
Measurement of the partial cross sections σ_{TT}, σ_{LT}, and $(\sigma_T + \varepsilon\sigma_L)$ of the $^1H(e,e'\pi^+)n$ reaction in the Δ(1232) resonance,
Phys. Rev. C **84** (2011) 028201

Abstract: We report precision ^{1}H(e,e'π$^+$)n measurements in the Δ(1232) resonance at Q^2 = 0.127(GeV/c)^2 obtained at the MIT-Bates out-of-plane scattering facility. These are the lowest, but nonzero, Q^2 measurements in the π$^+$ channel. The data offer tests of the theoretical calculations, particularly of the background amplitude contributions. The chiral effective field theory and Sato-Lee model calculations are not in agreement with this experiment.

J60. S. Stave *et al.*, MAMI A1 Collaboration:
Measurements of the $\gamma^* p \rightarrow \Delta$ reaction at low Q^2: Probing the mesonic contribution,
Phys. Rev. C **78** (2008) 025209

Abstract: The determination of nonspherical angular momentum amplitudes in nucleons at long ranges (low Q^2) was accomplished through the $p(\vec{e},e'p)\pi^0$ reaction in the Δ region at Q^2 = 0.060, 0.127, and 0.200 (GeV/c)^2 at the Mainz Microtron with an accuracy for the cross sections of 4%. The results for the dominant transition magnetic dipole amplitude and the quadrupole to dipole ratios have been obtained with an estimated model uncertainty that is approximately the same as the experimental uncertainty. Lattice and effective field theory predictions agree with our data within the relatively large estimated theoretical uncertainties. Phenomenological models are in good agreement with experiment when the resonant amplitudes are adjusted to the data. To check reaction model calculations additional data were taken for center-of-mass energies below resonance and for the $\sigma_{LT'}$ structure function. These results confirm the dominance, and general Q^2 variation, of the pionic contribution at large distances.

J59. N.F. Sparveris *et al.*, MAMI A1 Collaboration:
Virtual Compton scattering measurements in the $\gamma^* N \rightarrow \Delta$ transition,
Phys. Rev. C **78** (2008) 018201

Abstract: We report on new H(e, e'p)γ measurements in the Δ(1232) resonance at Q^2 = 0.06 (GeV/c)^2 carried out simultaneously with H(e, e'p)π^0. It is the lowestQ^2 for which the virtual Compton scattering (VCS) reaction has been studied in the first resonance region. The VCS measured cross sections are well described by dispersion relation calculations in which the multipole amplitudes derived from H(e, e'p)π^0 data are used as input, thus confirming the compatibility of the results. The derived resonant magnetic dipole amplitude $M_{1+}^{3/2}$ = (40.60 ± 0.70$_{stat+sys}$) (10^{-3}/m$_{π+}$) at W = 1232 MeV is in excellent agreement with the value extracted from H(e, e'p)π^0 measurements.

J58. N.F. Sparveris *et al.*, MAMI A1 Collaboration:
*Determination of quadrupole strengths in the γ*p→ Δ(1232) transition at Q² = 0.20 (GeV/c)²,*
Phys. Lett. **651B** (2007) 102-107

Abstract: We report new precise $p(\vec{e},e'p)\pi^0$ measurements at the peak of the Δ⁺(1232) resonance at Q² = 0.20 (GeV/c)² performed at the Mainz Microtron (MAMI). The new data are sensitive to both the electric (E2) and the Coulomb (C2) quadrupole amplitudes of the γ*N → Δ transition. They yield precise quadrupole to dipole amplitude ratios: CMR = (−5.09 ± $0.28_{stat+sys}$ ± 0.30_{model}) % and EMR = (−1.96 ± $0.68_{stat+sys}$ ± 0.41_{model}) % for $M_{1+}^{3/2}$ = (39.57 ± $0.75_{stat+sys}$ ± 0.40_{model}) ($10^{-3}/m_{\pi+}$). The new results are in disagreement with Constituent Quark Model predictions and in qualitative agreement with models that account for mesonic contributions, including recent Lattice calculations. They thus give further credence to the conjecture of deformation in hadronic systems favoring the attribution of the origin of deformation to the dominance of mesonic effects.

J57. S. Stave *et al.*, MAMI A1 Collaboration:
*Lowest-Q² measurement of the γ*p→Δ reaction: Probing the pionic contribution,*
Eur. Phys. J. A **30** (2006) 471-476

Abstract: To determine nonspherical angular-momentum amplitudes in hadrons at long ranges (low Q²), data were taken for the $p(\vec{e},e'p)\pi^0$ reaction in the Δ region at Q² = 0.060 (GeV/c)² utilizing the magnetic spectrometers of the A1 Collaboration at MAMI. The results for the dominant transition magnetic dipole amplitude and the quadrupole to dipole ratios at W = 1232 MeV are $M_{1+}^{3/2}$ = (40.33 ± $0.63_{stat+sys}$ ± 0.61_{model}) ($10^{-3}/m_{\pi+}$), $\mathrm{Re}(E_{1+}^{3/2}/M_{1+}^{3/2})$ =(-2.28 ± $0.29_{stat+sys}$ ± 0.20_{model})%, and $\mathrm{Re}(S_{1+}^{3/2}/M_{1+}^{3/2})$ =(-4.81 ± $0.27_{stat+sys}$ ± 0.26_{model})%. These disagree with predictions of constituent quark models but are in reasonable agreement with lattice calculations with nonlinear (chiral) pion mass extrapolations, with chiral effective field theory, and with dynamical models with pion cloud effects. These results confirm the dominance, and general Q² variation, of the pionic contribution at large distances.

J56. P. Bourgeois *et al.*, OOPS Collaboration:
Measurements of the Generalized Electric and Magnetic Polarizabilities of the Proton at Low Q² Using the Virtual-Compton-Scattering Reaction,
Phys. Rev. Lett. **97** (2006) 212001

Abstract: The mean square polarizability radii of the proton have been measured for the first time in a virtual-Compton-scattering experiment performed at the MIT-Bates out-of-plane scattering facility. Response functions and polarizabilities obtained from a dispersion analysis of the data at Q² = 0.057 GeV²/c² are in agreement with *O(p³)* heavy baryon chiral perturbation theory. The data support the dominance of mesonic effects in the polarizabilities.

J55. P. Papagiannis, E. Pantelis, E. Georgiou, P. Karaiskos, A. Angelopoulos, L. Sakelliou, S. Stiliaris, D. Baltas and I. Seimenis:
Polymer gel dosimetry for the TG-43 dosimetric characterization of a new ^{125}I interstitial brachytherapy seed,
Phys. Med. Biol. **51** (2006) 2101-2111

Abstract: In this work, a polymer gel–magnetic resonance (MR) imaging method is employed for the dosimetric characterization of a new ^{125}I low dose rate seed (IsoSeed model I25.S17). Two vials filled with PABIG gel were prepared in-house and one new seed as well as one commercially available ^{125}I seed of similar dose rate and well-known dosimetric parameters (IsoSeed model I25.S06) were positioned in each vial. Both seeds in each vial were MR scanned simultaneously on days 11 and 26 after implantation. The data obtained from the known seed in each vial are used to calibrate the gel dose response which, for the prolonged irradiation duration necessitated by the investigated dose rates, depends on the overall irradiation time. Data for this study are presented according to the AAPM TG-43 dosimetric formalism. Polymer gel results concerning the new seed are compared to corresponding, published dosimetric results obtained, for the purpose of the new

seed clinical implementation, by our group using the established methods of Monte Carlo (MC) simulation and thermo-luminescence dosimetry (TLD). Polymer gel dosimetry yields an average dose rate constant value of Λ = (0.921 ± 0.031) cGy h^{-1} U^{-1} relative to $_{MC}\Lambda$ = (0.929 ± 0.014) cGy h^{-1} U^{-1}, $_{TLD}\Lambda$ = (0.951 ± 0.044) cGy h^{-1} U^{-1} and the average value of Λ = (0.940 ± 0.051) cGy h^{-1} U^{-1} proposed for the clinical implementation of the new seed. Results for radial dose function, $g_L(r)$, and anisotropy function, $F(r,\theta)$, also agree with corresponding MC calculations within experimental uncertainties which are smaller for the polymer gel method compared to TLD. It is concluded that the proposed polymer gel–magnetic resonance imaging methodology could be used at least as a supplement to the established techniques for the dosimetric characterization of new low energy and low dose rate interstitial brachytherapy seeds.

J54. E. Stiliaris:
Parity Violation in Nuclear Systems
Experimental considerations in the deuteron photodisintegration with polarized photons,
Eur. Phys. J. A **24** (2005) 175-178

Abstract: Experimental measurements of Parity Non-Conserving (PNC) asymmetries in simple nuclear systems represent always a key-tool for the study of the weak nucleon-nucleon interaction and consequently an accurate experimental method for the determination of the meson-nucleon weak coupling constants of the underlying theory. Recent theoretical analysis on the deuteron photodisintegration with polarized photons, a few MeV above threshold, has drastically improved previous theoretical estimates. Based on that, the feasibility of measuring the photon asymmetry A_γ in the reaction $\vec{\gamma} + d \rightarrow n + p$ with the 10-MeV CW Linac at the Institute of Accelerating Systems and Applications (IASA) is considered here. A brief review on previous experimental results obtained in the deuteron photodisintegration and in the thermal neutron radiative capture on protons (inverse reaction) is given. The most important parameters in the design of a nuclear parity experiment are presented and the crucial factors, such as beam intensity, beam polarization and neutron detection techniques with the required high accuracy are outlined.

J53. E. Pantelis, G. Lymperopoulou, P. Papagiannis, L. Sakelliou, E. Stiliaris, P. Sandilos, I. Seimenis, M. Kozicki and J.M. Rosiak:
Polymer Gel Dosimetry Close to an ^{125}I Interstitial Brachytherapy Seed,
Phys. Med. Biol. **50** (2005) 4371-4384

Abstract: Despite its advantages, the polymer gel–magnetic resonance imaging (MRI) method has not, as yet, been successfully employed in dosimetry of low energy/low dose rate photon-emitting brachytherapy sources such as ^{125}I or ^{103}Pd interstitial seeds. In the present work, two commercially available ^{125}I seed sources, each of approximately 0.5 U, were positioned at two different locations of a polymer gel filled vial. The gel vial was MR scanned with the sources in place 19 and 36 days after seed implantation. Calibration curves were acquired from the coupling of MRI measurements with accurate Monte Carlo dose calculations obtained simulating the exact experimental setup geometry and materials. The obtained gel response data imply that while linearity of response is sustained, sensitivity (calibration curve slope) is significantly increased (approximately 60%) compared to its typical value for the ^{192}Ir (or ^{60}Co and 6 MV LINAC) photon energies. Water equivalence and relative energy response corrections of the gel cannot account for more than 3–4% of this increase, which, therefore, has to be mainly attributed to physicochemical processes related to the low dose rate of the sources and the associated prolonged irradiation time. The calibration data obtained from one ^{125}I source were used to provide absolute dosimetry results for the other ^{125}I source, which were found to agree with corresponding Monte Carlo calculations within experimental uncertainties. It is therefore suggested that, regardless of the underlying factors accounting for the gel dose response to ^{125}I irradiations, polymer gel dosimetry of new ^{125}I or ^{103}Pd sources should be carried out as originally proposed by Heard and Ibbot (2004 J. Phys.: *Conf. Ser.* **3** 221-3), i.e., by irradiating the same gel sample with the new low dose rate source, as well as with a well-characterized low dose rate source which will provide the dose calibration curve for the same irradiation conditions.

J52. N.D. Giokaris, G. Loudos, D. Maintas, A. Karabarbounis, M. Lembesi, V. Spanoudaki, E. Stiliaris, S. Boukis, A. Gektin, V. Pedash, V. Gayshan:
Partially Slotted Crystals for a High-Resolution γ-Camera based on a Position

Sensitive Photomultiplier,
Nucl. Instr. and Meth. A **550** (2005) 305-312

Abstract: Partially slotted crystals have been designed and constructed and have been used to evaluate the performance with respect to the spatial resolution of a γ-camera based on a position-sensitive photomultiplier. It is shown that the resolution obtained with such a crystal is only slightly worse than the one obtained with a fully pixelized one whose cost, however, is much higher.

J51. N. Sparveris *et al.*, OOPS Collaboration:
Investigation of the Conjectured Nucleon Deformation at Low Momentum Transfer,
Phys. Rev. Lett. **94** (2005) 022003

Abstract: We report new precise H(e,e'p)π^0 measurements at the Δ(1232) resonance at Q^2= 0.127 $(GeV/c)^2$ obtained at the MIT-Bates out-of-plane scattering facility which are particularly sensitive to the transverse electric amplitude (E2) of the γ*N→Δ transition. The new data have been analyzed together with those of earlier measurements to yield precise quadrupole to dipole amplitude ratios: $\mathrm{Re}(E_{1+}^{3/2}/M_{1+}^{3/2})$ = (-2.3 ± $0.3_{stat+sys}$ ± 0.6_{model}) % and $\mathrm{Re}(S_{1+}^{3/2}/M_{1+}^{3/2})$ = (-6.1 ± $0.2_{stat+sys}$ ± 0.5_{model}) % for $M_{1+}^{3/2}$ = (41.4 ± $0.3_{stat+sys}$ ± 0.4_{model}) ($10^{-3}/m_{\pi+}$). The derived amplitudes give credence to the conjecture of deformation in hadrons favoring, at low Q^2, the dominance of mesonic effects.

J50. D. Lazaro, I. Buvat, G. Loudos, D. Strul, G. Santin, N. Giokaris, D. Donnarieix, L. Maigne, V. Spanoudaki, S. Styliaris, S. Staelens and V. Breton:
Validation of the GATE Monte Carlo Simulation Platform for Modelling a CsI(Tl) Scintillation Camera dedicated to Small-Animal Imaging,
Phys. Med. Biol. **49** (2004) 271-285

Abstract: Monte Carlo simulations are increasingly used in scintigraphic imaging to model imaging systems and to develop and assess tomographic reconstruction algorithms and correction methods for improved image quantitation. GATE (GEANT4 application for tomographic emission) is a new Monte Carlo simulation platform based on GEANT4 dedicated to nuclear imaging applications. This paper describes the GATE simulation of a prototype of scintillation camera dedicated to small-animal imaging and consisting of a CsI(Tl) crystal array coupled to a position-sensitive photomultiplier tube. The relevance of GATE to model the camera prototype was assessed by comparing simulated ^{99m}Tc point spread functions, energy spectra, sensitivities, scatter fractions and image of a capillary phantom with the corresponding experimental measurements. Results showed an excellent agreement between simulated and experimental data: experimental spatial resolutions were predicted with an error less than 100 μm. The difference between experimental and simulated system sensitivities for different source-to-collimator distances was within 2%. Simulated and experimental scatter fractions in a [98-182 keV] energy window differed by less than 2% for sources located in water. Simulated and experimental energy spectra agreed very well between 40 and 180 keV. These results demonstrate the ability and flexibility of GATE for simulating original detector designs. The main weakness of GATE concerns the long computation time it requires: this issue is currently under investigation by the GEANT4 and the GATE collaborations.

J49. N.D. Giokaris, G.K. Loudos, D. Maintas, D. Papapanagiotou, K.S. Nikita, N.K. Uzunoglu, A. Karabarbounis, C.N. Papanicolas, E. Stiliaris, S.C. Archimandritis, A.D. Varvarigou, C.N. Stefanis, S. Majewski, A. Weisenberger, R. Pani, F. Scopinaro:
Imaging of Breast Phantoms using a High-Resolution Position Sensitive Photomultiplier Tube,
Nucl. Instr. and Meth. A **497** (2003) 141-149

Abstract: The results of studies conducted with a small field of view gamma camera based on a Position Sensitive Photomultiplier Tube (PSPMT) and a pixelized scintillator crystal, made of CsI(Tl), are reported. Using a computer-controlled step motor allowing object rotation, projection data from several angles are acquired. Images of slices of the object are obtained and compared with the use of a Filtered Backprojection and a Maximum Likelihood algorithm. Phantom studies have shown a spatial resolution of 2–3 mm in both two and three dimensions, and mice

experiments have shown successful SPECT imaging of small organs. 3D images obtained from a paraffin cylinder phantom and from a ^{99m}Tc water solution phantom showed that a "hot" spot with a size down to 0.2 ml can be detected with a resolution of about 2 mm if the tumor to background activity ratio is 6:1.

J48. N. Sparveris *et al.*, OOPS Collaboration:
Measurement of the R_{LT} Response Function for π^0 Electroproduction at Q^2= 0.070 (GeV/c)^2 in the N → Δ Transition,
Phys. Rev. C **67** (2003) 058201

Abstract: Quadrupole amplitudes in the γ*N → Δ transition are associated with the issue of nucleon deformation. A search for these small amplitudes has been the focus of a series of measurements undertaken at Bates/MIT by the OOPS Collaboration. We report on results from *H(e,e'p)π^0* data obtained at Q^2=0.070 (GeV/c)^2 and invariant mass of W=1155 MeV using the out-of-plane detection technique with the OOPS spectrometers. The σ_{LT} and $\sigma_T+\varepsilon\sigma_L$ response functions were isolated. These results, along with those of previous measurements at W=1172 MeV and Q^2=0.127 (GeV/c)^2, aim in elucidating the interplay between resonant and nonresonant amplitudes.

J47. C. Kunz *et al.*, OOPS Collaboration:
Measurement of the Transverse-Longitudinal Cross Sections in the $p(\vec{e},e'p)\pi^0$ Reaction in the Δ Region,
Phys. Lett. **564B** (2003) 21-26

Abstract: Accurate measurements of the $p(\vec{e},e'p)\pi^0$ reaction were performed at Q^2=0.127 (GeV/c)^2 in the Δ resonance energy region. The experiments at the MIT-Bates Linear Accelerator used an 820 MeV polarized electron beam with the out-of-plane magnetic spectrometer system (OOPS). In this Letter we report the first simultaneous determination of both the TL and TL' ("fifth" or polarized) cross sections at low Q^2 where the pion cloud contribution is predicted to dominate the quadrupole amplitudes (E2 and C2). These are the real and imaginary parts of the transverse-longitudinal interference amplitudes and provide a sensitive determination of the Coulomb quadrupole amplitude and a test of reaction calculations. Comparisons with model calculations are presented. The empirical MAID calculation gives the best overall agreement with this accurate data. The parameters of this model for the values of the resonant multipoles are $|M_{1+}(I=3/2)|$ = $(40.9\pm0.3)\ 10^{-3}/m_\pi$, CMR = C2/M1 = -6.5 ± 0.3 %, EMR = E2/M1 = -2.2 ± 0.9 %, where the errors are due to the experimental uncertainties.

J46. G.K. Loudos, K.S. Nikita, N.D. Giokaris, E. Styliaris, S.C. Archimandritis, A.D. Varvarigou, C.N. Papanicolas, S. Majewski, A. Weisenberger, R. Pani, F. Scopinaro, N.K. Uzunoglu, D. Maintas, K. Stefanis:
A 3D High-Resolution Gamma Camera for Radiopharmaceutical Studies with Small Animals,
Applied Radiation and Isotopes **58** (2003) 501-508

Abstract: The results of studies conducted with a small field of view tomographic gamma camera based on a Position Sensitive Photomultiplier Tube are reported. The system has been used for the evaluation of radiopharmaceuticals in small animals. Phantom studies have shown a spatial resolution of 2 mm in planar and 2–3 mm in tomographic imaging. Imaging studies in mice have been carried out both in 2D and 3D. Conventional radiopharmaceuticals have been used and the results have been compared with images from a clinically used system.

J45. Z.-L. Zhou *et al.*, OOPS Collaboration:
Performance of a Compact Detector Package for the Out-of-Plane Spectrometer System,
Nucl. Instr. and Meth. A **487** (2002) 365-380

Abstract: We report on the design and performance of compact detector packages currently installed in the four magnetic out-of-plane spectrometers for electron scattering experiments at the

MIT-Bates Linear Accelerator Center. The detector packages have been designed to meet the mechanical requirements arising from out-of-plane particle detection. They offer good trajectory and momentum reconstruction, particle identification and time-of-flight measurements for electrons, pions, protons and deuterons with large momentum bites and in broad kinematical ranges and high luminosities. The detectors have so far been used with great success in out-of-plane measurements of $^{12}C(\vec{e},e'p)$ virtual Compton scattering below pion threshold and in studies of the N → Δ transition in both exclusive reaction channels $^{1}H(\vec{e},e'p)\pi^{0}$ and $^{1}H(\vec{e},e'\pi^{+})\nu$.

J44. N. Giokaris, A. Karabarbounis, C.N. Papanicolas, E. Stiliaris, P. Phinou:
SPECT Detectors in Medical Imaging,
Greek Journal of Nuclear Medicine Vol.1, 4 (1998) 209-215

Abstract: The existing SPECT-cameras are detection systems of general use. They are composed of one or more detectors with a large field of view, their diameter being of about 30 cm and a spatial resolution of about 3 cm. They have been designed to image the largest possible part of the human body. Clinically, there has been the necessity of a special system with a much better spatial resolution for the imaging of relatively small parts of the human body. Such a camera, with a small field of view, could also be very important for radiopharmaceutical research in experiments with small animals. Recent advances in the development and the commercial availability of position sensitive photomultipliers (PSPMTs), with spatial resolution of the order of 1 mm, make now possible the construction of such systems. These new PSPMTs combined with all other, also improved, components of a γ-camera (scintillating crystal, collimator, readout electronics and computer) will soon lead to the construction of a new generation of γ-cameras for radiopharmaceutical research and for clinical applications.

J43. M. Derrick *et al*., ZEUS Collaboration:
Inclusive charged particle distribution in deep inelastic scattering events at HERA,
Z. Phys. C - Particles and Fields **70** (1996) 1-15

Abstract: A measurement of inclusive charged particle distributions in deep inelastic ep scattering for γ^*p centre-of-mass energies $75< W < 175$ GeV and momentum transfer squared $10< Q^2 < 160$ GeV^2 from the ZEUS detector at HERA is presented. The differential charged particle rates in the γ^*p centre-of-mass system as a function of the scaled longitudinal momentum, x_F, and of the transverse momentum, p_t^* and $\langle p_t^{*2}\rangle$, as a function of x_F, W and Q^2 are given. Separate distributions are shown for events with (LRG) and without (NRG) a rapidity gap with respect to the proton direction. The data are compared with results from experiments at lower beam energies, with the naive quark parton model and with parton models including perturbative QCD corrections. The comparison shows the importance of the higher order QCD processes. Significant differences of the inclusive charged particle rates between NRG and LRG events at the same W are observed. The value of $\langle p_t^{*2}\rangle$ for LRG events with a hadronic mass M_X, which excludes the forward produced baryonic system, is similar to the $\langle p_t^{*2}\rangle$ value observed in fixed target experiments at $W \approx M_X$.

J42. M. Derrick *et al*., ZEUS Collaboration:
Rapidity gaps between jets in photoproduction at HERA,
Phys. Lett. **369B** (1996) 55-68

Abstract: Photoproduction events which have two or more jets have been studied in the $W_{\gamma p}$ range $135 \text{ GeV} < W_{\gamma p} < 280$ GeV with the ZEUS detector at HERA. A class of events is observed with little hadronic activity between the jets. The jets are separated by pseudorapidity intervals Δη of up to four units and have transverse energies greater than 6 GeV. A gap is defined as the absence between the jets of particles with transverse energy greater than 300~MeV. The fraction of events containing a gap is measured as a function of Δη. It decreases exponentially as expected for processes in which colour is exchanged between the jets, up to a value of Δη~3, then reaches a constant value of about 0.1. The excess above the exponential fall-off can be interpreted as evidence for hard diffractive scattering via a strongly interacting colour singlet object.

J41. M. Derrick *et al*., ZEUS Collaboration:
Measurement of the proton structure function F_2 at low x and low Q^2 at HERA,

Z. Phys. C - Particles and Fields **69** (1996) 607-620

Abstract: We report on a measurement of the proton structure function F_2 in the range $3.5\times10^{-5} \le x \le 4\times10^{-3}$ and 1.5 GeV$^2 \le Q^2 \le$ 15 GeV^2 at the *ep* collider HERA operating at a centre-of-mass energy of $\sqrt{s}$ =300 GeV. The rise of F_2 with decreasing *x* observed in the previous HERA measurements persists in this lower *x* and Q^2 range. The Q^2 evolution of F_2, even at the lowest Q^2 and *x* measured, is consistent with perturbative QCD.

J40. M. Derrick *et al*., ZEUS Collaboration:
Measurement of elastic ρ^0 photoproduction at HERA,
Z. Phys. C - Particles and Fields **69** (1995) 39-54

Abstract: Elastic ρ^0 photoproduction has been measured using the ZEUS detector at HERA. Untagged photoproduction events from *ep* interactions were used to measure the reaction $\gamma p \to \rho^0 p$ ($\rho^0 \to \pi^+ \pi^-$) at photon-proton centre-of-mass energies between 60 and 80GeV and $|t|<0.5$GeV^2, where *t* is the square of the four-momentum transferred at the proton vertex. The differential cross section $d\sigma/dM_{\pi\pi}$, where $M_{\pi\pi}$ is the invariant mass of the two pions, and the integrated cross section, $\sigma_{\gamma p\to \rho 0\, p}$, are presented; the latter was measured to be 14.7±0.4(stat.)±2.4(syst.) μb. The differential cross section $d\sigma/dt$ has an approximately exponential shape; a fit of the type $A'_t\, exp(-b'_t|t|+c'_t\, t^2)$ yields a *t*-slope b'_t=9.9±1.2(stat.)±1.4(syst.) μb. The results, when compared to low energy data, show a weak energy dependence of both $\sigma_{\gamma p\to\ \rho 0\ p}$ and of the *t*-slope. The ρ^0 is produced predominantly with transverse polarisation, demonstrating that *s*-channel helicity conservation holds at these energies.

J39. M. Derrick *et al*., ZEUS Collaboration:
Measurement of the diffractive structure function in deep inelastic scattering at HERA,
Z. Phys. C - Particles and Fields **68** (1995) 569-584

Abstract: This paper presents an analysis of the inclusive properties of diffractive deep inelastic scattering events produced in *ep* interactions at HERA. The events are characterised by a rapidity gap between the outgoing proton system and the remaining hadronic system. Inclusive distributions are presented and compared with Monte Carlo models for diffractive processes. The data are consistent with models where the pomeron structure function has a hard and a soft contribution. The diffractive structure function is measured as a function of x_P, the momentum fraction lost by the proton, of β, the momentum fraction of the struck quark with respect to x_P, and of Q^2. The x_P dependence is consistent with the form $(1/x_P)^\alpha$ where $a = 1.30 \pm 0.08(stat)^{+0.08}_{-0.14}(sys)$ in all bins of β and Q^2. In the measured Q^2 range, the diffractive structure function approximately scales with Q^2 at fixed β. In an Ingelman-Schlein type model, where commonly used pomeron flux factor normalisations are assumed, it is found that the quarks within the pomeron do not saturate the momentum sum rule.

J38. M. Derrick *et al*., ZEUS Collaboration:
Neutral strange particle production in deep inelastic scattering at HERA,
Z. Phys. C - Particles and Fields **68** (1995) 29-42

Abstract: This paper presents measurements of K^0 and Λ production in neutral current, deep inelastic scattering of 26.7 GeV electrons and 820 GeV protons in the kinematic range $10 < Q^2 < 640$ GeV^2, $0.0003 < x < 0.01$, and $y>0.04$. Average multiplicities for K^0 and Λ production are determined for transverse momenta $p_T>0.5$ GeV and pseudorapidities $|\eta|<1.3$. The multiplicities favour a stronger strange to light quark suppression in the fragmentation chain than found in e^+e^- experiments. The production properties of K^0's in events with and without a large rapidity gap with respect to the proton direction are compared. The ratio of neutral K^0's to charged particles per event in the measured kinematic range is, within the present statistics, the same in both samples.

J37. M. Derrick *et al*., ZEUS Collaboration:
Measurement of charged and neutral current e-p deep inelastic scattering cross sections at high Q^2,

Phys. Rev. Letters **75** (1995) 1006-1011

Abstract: Deep inelastic *e-p* scattering has been studied in both the charged-current (CC) and neutral-current (NC) reactions at momentum transfers squared, Q^2, between 400 GeV^2 and the kinematic limit of 87500 GeV^2 using the ZEUS detector at the HERA *ep* collider. The CC and NC total cross sections, the NC to CC cross section ratio, and the differential cross sections, $d\sigma/dQ^2$, are presented. For $Q^2 \approx M_W^2$, where M_W is the mass of the *W* boson, the CC and NC cross sections have comparable magnitudes, demonstrating the equal strengths of the weak and electromagnetic interactions at high Q^2. The Q^2-dependence of the CC cross section determines the mass term in the CC propagator to be M_W = 76± 16 ± 13 GeV.

J36. M. Derrick *et al*., ZEUS Collaboration:
Measurement of α_s from jet rates in deep inelastic scattering at HERA,
Phys. Lett. **363B** (1995) 201-216

Abstract: Jet production in deep inelastic scattering for $120<Q^2<3600$ GeV^2 has been studied using data from an integrated luminosity of 3.2pb^{-1} collected with the ZEUS detector at HERA. Jets are identified with the JADE algorithm. A cut on the angular distribution of parton emission in the γ*-parton centre-of-mass system minimises the experimental and theoretical uncertainties in the determination of the jet rates. The jet rates, when compared to $O(\alpha_s^2)$ perturbative QCD calculations, allow a precise determination of $\alpha_s(Q)$ in three Q^2-intervals. The values are consistent with a running of $\alpha_s(Q)$, as expected from QCD. Extrapolating to $Q=M_{Z0}$ yields $\alpha_s(m_{Z0}) = 0.117 \pm 0.005(stat)^{+0.004}_{-0.005}(syst_{\exp}) \pm 0.007(syst_{theory})$.

J35. M. Derrick *et al*., ZEUS Collaboration:
Inclusive transverse momentum distributions of charged particles in diffractive and non-diffractive photoproduction at HERA,
Z. Phys. C - Particles and Fields **67** (1995) 227-237

Abstract: Inclusive transverse momentum spectra of charged particles in photoproduction events in the laboratory pseudorapidity range $-1.2<\eta<1.4$ have been measured up to p_T=8 GeV using the ZEUS detector. Diffractive and non-diffractive reactions have been selected with an average *γp* centre of mass (c.m.) energy of <W>= 180 GeV. For diffractive reactions, the p_T spectra of the photon dissociation events have been measured in two intervals of the dissociated photon mass with mean values $<M_x>$ = 5 GeV and 10 GeV. The inclusive transverse momentum spectra fall exponentially in the low p_T region. The non-diffractive data show a pronounced high p_T tail departing from the exponential shape. The p_T distributions are compared to lower energy photoproduction data and to hadron-hadron collisions at a similar c.m. energy. The data are also compared to the results of a next--to--leading order QCD calculation.

J34. M. Derrick *et al*., ZEUS Collaboration:
Exclusive ρ^0 production in deep inelastic electron-proton scattering at HERA,
Phys. Lett. **356B** (1995) 601-616

Abstract: The exclusive production of ρ^0 mesons in deep inelastic electron-proton scattering has been studied using the ZEUS detector. Cross sections have been measured in the range $7 < Q^2 < 25$ GeV^2 for *γ*p* centre of mass (c.m.) energies from 40 to 130 GeV. The $\gamma^*p \rightarrow \rho^0 p$ cross section exhibits a $Q^{-(4.2\pm0.8^{+1.4}_{-0.5})}$ dependence and both longitudinally and transversely polarised ρ^0's are observed. The $\gamma^*p \rightarrow \rho^0 p$ cross section rises strongly with increasing c.m. energy, when compared with NMC data at lower energy, which cannot be explained by production through soft pomeron exchange. The data are compared with perturbative QCD calculations where the rise in the cross section reflects the increase in the gluon density at low *x*.

J33. M. Derrick *et al*., ZEUS Collaboration:
Diffractive hard photoproduction at HERA and evidence for the gluon content of the pomeron,
Phys. Lett. **356B** (1995) 129-146

Abstract: Inclusive jet cross sections for events with a large rapidity gap with respect to the proton direction from the reaction ep → jet + X with quasi-real photons have been measured with the ZEUS detector. The cross sections refer to jets with transverse energies E_T^{jet} >8 GeV. The data show the characteristics of a diffractive process mediated by pomeron exchange. Assuming that the events are due to the exchange of a pomeron with partonic structure, the quark and gluon content of the pomeron is probed at a scale $\sim(E_T^{jet})^2$. A comparison of the measurements with model predictions based on QCD plus Regge phenomenology requires a contribution of partons with a hard momentum density in the pomeron. A combined analysis of the jet cross sections and recent ZEUS measurements of the diffractive structure function in deep inelastic scattering gives the first experimental evidence for the gluon content of the pomeron in diffractive hard scattering processes. The data indicate that between 30% and 80% of the momentum of the pomeron carried by partons is due to hard gluons.

J32. M. Derrick *et al*., ZEUS Collaboration:
Study of the photon remnant in resolved photoproduction at HERA,
Phys. Lett. **354B** (1995) 163-177

Abstract: Photoproduction at HERA is studied in ep collisions, with the ZEUS detector, for γp centre-of-mass energies ranging from 130-270 GeV. A sample of events with two high-p_T jets (p_T >6 GeV, η<1.6) and a third cluster in the approximate direction of the electron beam is isolated using a clustering algorithm. These events are mostly due to resolved photoproduction. The third cluster is identified as the proton remnant. Its properties, such as the transverse and the longitudinal energy flows around the axis of the cluster, are consistent with those commonly attributed to jets, and in particular with those found for the two jets in these events. The mean value of the photon remnant p_T with respect to the beam axis is measured to be 2.1 ± 0.2 GeV, which demonstrates substantial mean transverse momenta for the photon remnant.

J31. M. Derrick *et al*., ZEUS Collaboration:
Measurement of multiplicity and momentum spectra in the current fragmentation region of the Breit frame at HERA,
Z. Phys. C - Particles and Fields **67** (1995) 93-107

Abstract: Charged particle production has been measured in Deep Inelastic Scattering (DIS) events using the ZEUS detector over a large range of Q^2 from 10 to 1280 GeV^2. The evolution with Q of the charged multiplicity and scaled momentum has been investigated in the current fragmentation region of the Breit frame. The data are used to study QCD coherence effects in DIS and are compared with corresponding e^+e^- data in order to test the universality of quark fragmentation.

J30. M. Derrick *et al*., ZEUS Collaboration:
Jet production in high Q^2 deep-inelastic ep scattering at HERA,
Z. Phys. C - Particles and Fields **67** (1995) 81-92

Abstract: Two-jet production in deep-inelastic electron-proton scattering has been studied for $160<Q^2<1280$ GeV^2, $0.01<x<0.1$ and $0.04<y<0.95$ with the ZEUS detector at HERA. The kinematic properties of the jets and the jet production rates are presented. The partonic scaling variables of the two-jet system and the rate of two-jet production are compared to perturbative next-to-leading order QCD calculations.

J29. M. Derrick *et al*., ZEUS Collaboration:
Measurement of the cross section for the reaction γp → J/ψ p with the ZEUS Detector at HERA,
Phys. Lett. **350B** (1995) 120-134

Abstract: This paper reports the cross section measurements for the process $ep \rightarrow e\,J/\psi\,p$ for $Q^2 < 4$ GeV^2 at $\sqrt{s}$ =296 GeV, based on an integrated luminosity of about 0.5pb^{-1}, using the ZEUS detector. The J/ψ was detected in its e^+e^- and $\mu^+\mu^-$ decay modes. The photoproduction cross section was measured to be $52^{+7}_{-12} \pm 10$ nb at an average γp centre of mass energy of 67 GeV and $71^{+13}_{-20} \pm 12$ nb at

114 GeV. The significant rise of the cross section compared to lower energy measurements is not in agreement with VDM models, but can be described by QCD inspired models if a rise in the gluon momentum density at low *x* in the proton is assumed.

J28. M. Derrick *et al*., ZEUS Collaboration:
Study of D(2010)$^{\pm}$ Production in ep collisions at HERA,*
Phys. Lett. **349B** (1995) 225-237

Abstract: We report the first observation of charmed mesons with the ZEUS detector at HERA using the decay channel $D^{*+} \rightarrow (D^0 \rightarrow K^- \pi^+) \pi^+$ (+c.c.). Clear signals in the mass difference $\Delta M = M(D^*)-M(D^0)$ as well as in the $M(K\pi)$ distribution at the D^0 mass are found. The *ep* cross section for inclusive $D^{*\pm}$ production with $Q^2 < 4$ GeV^2 in the *γp* centre-of-mass energy range 115<W<275 GeV has been determined to be $(32 \pm 7^{+4}_{-7})$ nb in the kinematic region $\{p_T(D^*) \geq 1.7$ GeV, $|\eta(D^*)|<1.5\}$. Extrapolating outside this region, assuming a mass of the charm quark of 1.5 GeV, we estimate the *ep* charm cross section to be $\sigma(ep \rightarrow c\bar{c}X) = (0.45 \pm 0.11^{+0.37}_{-0.22})\mu b$ at $\sqrt{s}$ =296 GeV and <W>=198 GeV. The average *γp* charm cross section $\sigma(\gamma p \rightarrow c\bar{c}X)$ is found to be $(6.3 \pm 2.2^{+6.3}_{-3.0})\mu b$ at <W>=163 GeV and $(16.9 \pm 5.2^{+13.9}_{-8.5})\mu b$ at <W>=243 GeV. The increase of the total charm photoproduction cross section by one order of magnitude with respect to low energy data experiments is well described by QCD NLO calculations using singular gluon distributions in the proton.

J27. M. Derrick *et al*., ZEUS Collaboration:
Dijet Cross Sections in Photoproduction at HERA,
Phys. Lett. **348B** (1995) 665-680

Abstract: Dijet production by almost real photons has been studied at HERA with the ZEUS detector. Jets have been identified using the cone algorithm. A cut on x_γ^{OBS}, the fraction of the photon energy participating in the production of the two jets of highest transverse energy, is used to define cross sections sensitive to the parton distributions in the proton and in the photon. The dependence of the dijet cross sections on pseudorapidity has been measured for $x_\gamma^{OBS} \geq 0.75$ and $x_\gamma^{OBS} < 0.75$. The former is sensitive to the gluon momentum density in the proton. The latter is sensitive to the gluon in the photon. The cross sections are corrected for detector acceptance and compared to leading order QCD calculations.

J26. M. Derrick *et al*., ZEUS Collaboration:
Observation of Hard Scattering in Photoproduction Events with a Large Rapidity Gap at HERA,
Phys. Lett. **346B** (1995) 399-414

Abstract: Events with a large rapidity gap and total transverse energy greater than 5 GeV have been observed in quasi-real photoproduction at HERA with the ZEUS detector. The distribution of these events as a function of the *γp* centre of mass energy is consistent with diffractive scattering. For total transverse energies above 12 GeV, the hadronic final states show predominantly a two-jet structure with each jet having a transverse energy greater than 4 GeV. For the two-jet events, little energy flow is found outside the jets. This observation is consistent with the hard scattering of a quasi-real photon with a colourless object in the proton.

J25. M. Derrick *et al*., ZEUS Collaboration:
Extraction of the Gluon Density of the Proton at Small x,
Phys. Lett. **345B** (1995) 576-588

Abstract: The gluon momentum density $xg(x,Q^2)$ of the proton was extracted at $Q^2 = 20$ GeV^2 for small values of x between 4×10^{-4} and 10^{-2} from the scaling violations of the proton structure function F_2 measured recently by ZEUS in deep inelastic neutral current ep scattering at HERA. The extraction was performed in two ways. Firstly, using a global NLO fit to the ZEUS data on F_2 at low x constrained by measurements from NMC at larger x; and secondly using published approximate methods for the solution of GLAP QCD evolution equations. Consistent results are obtained. A substantial increase of the gluon density is found at small x in comparison with the NMC result

obtained at larger values of x.

J24. M. Derrick *et al*., ZEUS Collaboration:
Inclusive Jet Differential Cross Sections in Photoproduction at HERA,
Phys. Lett. **342B** (1995) 417-432

Abstract: Inclusive jet differential cross sections for the reaction ep → jet + X at Q^2 below 4 GeV^2 have been measured with the ZEUS detector at HERA using an integrated luminosity of 0.55pb^{-1}. These cross sections are given in the kinematic region 0.2<y<0.85, for jet pseudorapidities in the ep-laboratory range -1< η^{jet}<2 and refer to jets at the hadron level with a cone radius of one unit in the η-φ plane. The results correspond to quasi-real photoproduction at center-of-mass energies in the range 130-270 GeV and, approximately, for jet pseudorapidities in the interval -3 < η^{jet} (γp CMS) < 0. These measurements cover a new kinematic regime of the partonic structure of the photon, at typical scales up to 300 GeV^2 and photon fractional momenta down to $x_\gamma \sim 10^{-2}$. Leading logarithm parton shower Monte Carlo calculations, which include both resolved and direct processes and use the predictions of currently available parametrisations of the photon parton distributions, describe in general the shape and magnitude of the measured η^{jet} and E_T^{jet} distributions.

J23. M. Derrick *et al*., ZEUS Collaboration:
A Search for Excited Fermions in Electron-Proton Collisions at HERA,
Z. Phys. C - Particles and Fields **65** (1995) 627-647

Abstract: A search for excited states of the standard model fermions was performed using the ZEUS detector at the HERA electron-proton collider, operating at a centre of mass energy of 296 GeV. In a sample corresponding to an integrated luminosity of 0.55pb^{-1}, no evidence was found for any resonant state decaying into final states composed of a fermion and a gauge boson. Limits on the coupling strength times branching ratio of excited fermions are presented for masses between 50 GeV and 250 GeV, extending previous search regions significantly.

J22. M. Derrick *et al*., ZEUS Collaboration:
Measurement of the Proton Structure Function F_2 from the 1993 HERA Data,
Z. Phys. C - Particles and Fields **65** (1995) 379-398

Abstract: The ZEUS detector has been used to measure the proton structure function F_2. During 1993 HERA collided 26.7 GeV electrons on 820 GeV protons. The data sample corresponds to an integrated luminosity of 0.54pb^{-1}, representing a twenty fold increase in statistics compared to that of 1992. Results are presented for 7 < Q^2 < 104 GeV^2 and x values as low as 3 x 10^{-4}. The rapid rise of the F_2 as x decreases observed previously in now studied in greater detail and persists for Q^2 values up to 500 GeV^2.

J21. M. Derrick *et al*., ZEUS Collaboration:
Comparison of Energy Flows in Deep Inelastic Scattering Events with and without a Large Rapidity Gap,
Phys. Lett. **338B** (1994) 483-496

Abstract: Energy flows in deep inelastic electron-proton scattering are investigated at a center-of-mass energy of 296 GeV for the range $Q^2 \geq 10$ GeV^2 using the ZEUS detector. A comparison is made between events with and without a large rapidity gap between the hadronic system and the proton direction. The energy flows, corrected for detector acceptance and resolution, are shown for these two classes of events in both the HERA laboratory frame and the Breit frame. From the differences in the shapes of these energy flows we conclude that QCD radiation is suppressed in the large-rapidity-gap events compared to the events without a large rapidity gap.

J20. M. Derrick *et al*., ZEUS Collaboration:
Observation of Jet Production in Deep Inelastic Scattering with a Large Rapidity Gap at HERA,
Phys. Lett. **332B** (1994) 228-243

Abstract: Events with a large rapidity gap in deep inelastic scattering with $Q^2 \leq 10$ GeV^2 have been studied in the ZEUS detector. The properties of these events with W > 140 GeV are consistent with a leading twist diffractive production mechanism. In the laboratory frame, with $E_T^{jet} \geq 4$GeV, 15% of the events are of the 1-jet type with negligible 2-jet production. The single jet is back-to-back in azimuth with the scattered electron. No energy flow is observed between the jet and the proton direction. With a lower jet transverse energy cut 2-jet production is observed both in the laboratory and the $\gamma^* p$ centre-of-mass systems, demonstrating the presence of hard scattering in the virtual photon proton interaction that give rise to large rapidity gap events.

J19. M. Derrick *et al*., ZEUS Collaboration:
Measurement of Total and Partial Photon Proton Cross Sections at 180 GeV Center of Mass Energy,
Z. Phys. C - Particles and Fields **63** (1994) 391-408

Abstract: Photon proton cross sections for elastic light vector meson production, $\sigma_{el}^{\gamma p}$, inelastic diffractive production, $\sigma_{d}^{\gamma p}$, non-diffractive production, $\sigma_{nd}^{\gamma p}$, as well as the total cross section, $\sigma_{tot}^{\gamma p}$, have been measured at an average γp center of mass energy of 180 GeV with the ZEUS detector at HERA. The resulting values are $\sigma_{el}^{\gamma p}$=18±7 μb, $\sigma_{d}^{\gamma p}$=33±8 μb, $\sigma_{nd}^{\gamma p}$=91±11 μb, $\sigma_{tot}^{\gamma p}$=143±17 μb, where the errors include statistical and systematic errors added in quadrature.

J18. M. Derrick *et al*., ZEUS Collaboration:
Observation of Direct Processes in Photoproduction at HERA,
Phys. Lett. **322B** (1994) 287-300

Abstract: Jets in photoproduction events have been studied with the ZEUS detector for γp centre-of-mass energies ranging from 130 to 250 GeV. The inclusive jet distributions give evidence for the dominance of resolve photon interactions. In the di-jet sample the direct processes are for the first time clearly isolated. Di-jet cross sections for the resolved and direct processes are given in a restricted kinematic range.

J17. H.G. Bohlen, E. Stiliaris, B. Gebauer, W. von Oertzen, M. Wilpert, Th. Wilpert, A. Ostrowski, D.T. Khoa, A.S. Demyanova, A.A. Ogloblin:
Refractive Scattering and Reactions, Comparison of two Systems: $^{16}O+^{16}O$ and $^{20}Ne+^{12}C$,
Z. Phys. A - Atomic Nuclei **346** (1993) 189-200

Abstract: Elastic, inelastic scattering as well as one-neutron transfer channels have been measured over a wide angular range for systems $^{16}O+^{16}O$ at the incident energy of 350 MeV and $^{20}Ne+^{12}C$ at 390 MeV, respectively, using the Q3D magnetic spectrometer. In both cases differential cross sections have been measured down to about 50 nb/sr (or $d\sigma/d\Omega_R \leq 10^{-4}$) at large angles. For the $^{16}O+^{16}O$ system refractive contributions are found at the level of these cross sections, whereas in the $^{20}Ne+^{12}C$ case a steeper decrease of the differential cross section with the angle is observed and the refractive contribution can not be determined. The elastic scattering data have been analyzed using standard Woods-Saxon potentials and potentials calculated in different versions of the double-folding model. Some properties of these potentials are tested in the calculations for inelastic scattering and one-neutron transfer within the DWBA. With the refractive pattern observed for the $^{16}O+^{16}O$ system, the scattering and transfer data are found to be sensitive to the interaction potential at small internuclear distances down to about 2.5 fm.

J16. M. Derrick *et al*., ZEUS Collaboration:
Measurement of the Proton Structure Function F_2 in ep Scattering at HERA,
Phys. Lett. **316B** (1993) 412-426

Abstract: This paper presents our first measurement of the F_2 structure function in neutral-current, deep inelastic scattering using the ZEUS detector at HERA, the *ep* colliding beam facility at DESY.

The data correspond to an integrated luminosity of 24.7nb^{-1}. Results are presented for data in a range of Q^2 from 10 GeV^2 to 4700 GeV^2 and Bjorken x down to 3.0 x 10^{-4}. The F_2 structure function increases rapidly as x decreases.

J15. M. Derrick *et al*., ZEUS Collaboration:
Search for Excited Electrons using the ZEUS Detector,
Phys. Lett. **316B** (1993) 207-218

Abstract: This paper reports a search for excited electrons at the HERA electron-proton collider. In a sample corresponding to an integrated luminosity of 26nb^{-1}, no evidence was found for any resonant state decaying into $e\gamma$, νW^- or eZ^0. Limits on the coupling strength of an excited electron have been determined for masses between 45 and 225 GeV. This study also reports the observation of the wide-angle $e\gamma$ Compton scattering process.

J14. M. Derrick *et al*., ZEUS Collaboration:
Observation of Events with a Large Rapidity Gap in Deep Inelastic Scattering at HERA,
Phys. Lett. **315B** (1993) 481-493

Abstract: In deep inelastic, neutral current scattering of electrons and protons at $\sqrt{s} = 296$ GeV, we observe in the ZEUS detector events with a large rapidity gap in the hadronic final state. They occur in the region of small Bjorken x and are observed up to Q^2 of 100 GeV^2. They account for about 5% of the events with $Q^2 \geq 10$ GeV^2. Their general properties are inconsistent with the dominant mechanism of deep inelastic scattering, where color is transferred between the scattered quark and the proton remnant, and suggest that the underlying production mechanism is the diffractive dissociation of the virtual photon.

J13. M. Derrick *et al*., ZEUS Collaboration:
Hadronic Energy Distributions in Deep-Inelastic Electron-Proton Scattering,
Z. Phys. C - Particles and Fields **59** (1993) 231-242

Abstract: This paper presents energy distributions of the hadronic system produced in neutral-current electron-proton deep-inelastic scattering at a center-of-mass energy of 296 GeV. Comparison of the results with QCD Monte Carlo models shows that QCD radiation has a strong influence on the characteristics of the final state. The data are reasonably reproduced by the Lund model based on a matrix element calculation in first order of ${\alpha}_s$, followed by appropriate parton showers, as well as by the colour dipole model. The HERWIG parton shower model also gives a reasonable representation of the data. Neither the first order matrix elements alone nor the Lund parton shower model, without the matrix element calculation, reproduce the data.

J12. C. Berat, M. Buenerd, J.Y. Hostachy, P. Martin, J. Barrette, B. Berthier, B. Fernandez, A. Miczaika, A. Villari, H.G. Bohlen, S. Kubono, E. Stiliaris, W. von Oertzen:
^{13}C induced Charge Exchange Reactions to probe the Electric Isovector Nuclear Response,
Nucl. Phys. **A555** (1993) 455-476

Abstract: The reaction (^{13}C,^{13}N) has been studied at 50 MeV/u on a set of nuclear targets including ^{12}C, ^{40}Ca, ^{58,60}Ni, ^{90}Zr, ^{120}Sn and ^{208}Pb. Excitation of the ΔT_z=1 giant dipole resonance has been observed in light nuclei
(A ≤ 60) and corresponding angular distribution have been measured. A broad structure is observed at excitation energy above the GDR in nuclei with A ≥ 60. Angular-distribution measurements of elastic-scattering cross sections are also reported on ^{12}C and ^{58}Ni, as well as excitation of low-lying states in ^{12}B. Microscopic DWBA analysis of the results is presented. Some results of the (^{13}C,^{13}B) reaction are also presented.

J11. M. Derrick *et al*., ZEUS Collaboration:
Search for Leptoquarks with the ZEUS Detector,

Phys. Lett. **306B** (1993) 173-186

Abstract: A search for any resonant state coupled to an electron and a proton constituent has been performed using collisions of electron and proton beams at HERA. In a sample with integrated luminosity of 26 nb^{-1}, no evidence has been found for production of leptoquarks with decays to e^- + jet or ν + jet. Limits on the coupling strength of scalar leptoquarks to electron and quark have been determined for masses above 25 GeV. For example, scalar isosinglet leptoquarks (S_0) with electroweak coupling strength to e^-u states are ruled out at the 95% confidence level for masses below 168 GeV for left-handed couplings and below 176 GeV for right-handed couplings.

J10. M. Derrick *et al*., ZEUS Collaboration:
Observation of two jet production in deep inelastic scattering at HERA,
Phys. Lett. **306B** (1993) 158-172

Abstract: A sample of events with two distinct jets, in addition to the proton remnant, has been identified in deep inelastic, neutral current *ep* interactions recorded at HERA by the ZEUS experiment. For these events, the mass of the hadronic system ranges from 40 to 260 GeV. The salient features of the observed jet production agree with the prediction of higher order QCD.

J9. M. Derrick *et al*., ZEUS Collaboration:
Initial Study of Deep Inelastic Scattering with ZEUS at HERA,
Phys. Lett. **303B** (1993) 183-197

Abstract: Results are presented on neutral current, deep inelastic scattering measured in collisions of 26.7 GeV electrons and 820 GeV protons. The events typically populate a range in Q^2 from 10 to 100 GeV^2. The values of x extend down to $x \sim 10^{-4}$ which is two orders of magnitude lower than previously measured at such Q^2 values in fixed target experiments. The measured cross sections are in accord with the extrapolations of current parametrisations of parton distributions.

J8. M. Wilpert, B. Gebauer, W. von Oertzen, Th. Wilpert, E. Stiliaris and H.G. Bohlen:
Cold Multiproton-Transfer Reactions in the System $^{86}Kr+^{54}Fe$ below the Coulomb Barrier,
Phys. Rev. **C44** (1991) 1081-1085

Abstract: Angular distributions of the one- up to four-proton transfer have been measured in the system $^{86}Kr+^{54}Fe$ at an energy of E_{lab}=291 MeV. The one- and two-proton-transfer angular distributions are well described by the distorted-wave Born approximation. The three- and four-proton transfers show strong deviations from this approach with contributions which are isotropic. The isotropic component is attributed to reaction processes with a longer time scale. This conjecture is supported by the observed total energy loss of 15-20 MeV, consistent with fission systematics, where strongly deformed and cold fragments are produced. These results are interpreted as the decay of a long-lived two-center system which is stabilized by shell effects.

J7. M. Braeunig, W. von Oertzen, H.G. Bohlen, A. Miczaika, E. Stiliaris, M. Buenerd, C. Berat, J. Chauvin, D. Lebrun, J.Y. Hostachy and Ph. Martin:
Proton Stripping induced by ^{13}C at 50 MeV/Nucleon on ^{12}C, ^{40}Ca and ^{58}Ni,
Nucl. Phys. **A519** (1990) 631-645

Abstract: The (^{13}C,^{12}B) reaction has been investigated at an incident energy of 50 MeV/u on ^{12}C, ^{40}Ca and ^{58}Ni using a magnetic spectrometer. The angular range measured covers the 0^o beam direction. Angular distributions of discrete states as well as of structures in the continuum have been measured. They are compared with DWBA calculations. The absolute value of the cross section for the ^{12}C target is well reproduced, whereas for ^{40}Ca and ^{58}Ni discrepancies of a factor 10 are observed.

J6. E. Stiliaris, H.G. Bohlen, P. Froebrich, B. Gebauer, D. Kolbert, W. von Oertzen, M. Wilpert and Th. Wilpert:

Nuclear Rainbow Structure in the Elastic Scattering of ^{16}O on ^{16}O at E_L=350 MeV,
Phys. Lett. **223B** (1989) 291-295

Abstract: The elastic scattering of^{16}O on ^{16}O has been measured at 22 MeV/u in a large angular range up to $\theta_{cm}=61^o$ with high accuracy. Besides the Fraunhofer diffractive patterns at forward angles a clear oscillatory structure is observed at large angles. It is shown in a semi-classical analysis that this structure is due to a rainbow interference of two refractive amplitudes (the second Airy maximum is identified). These data show a nuclear rainbow structure for the first time in heavy-ion scattering (A>6) with unambiguous clarity.

J5. C. Berat, M. Buenerd, J. Chauvin, J.Y. Hostachy, D. Lebrun, P. Martin, J. Barrette, B. Berthier, B. Fernandez, A. Miczaika, E. Stiliaris, W. von Oertzen, H. Lenske, H.H. Wolter:
Heavy Ion Charge Exchange Reactions to probe the Giant Electric Isovector Modes in Nuclei,
Phys. Lett. **218B** (1989) 299-303

Abstract: The (^{13}C,^{13}N) reaction has been studied at E/A = 50 MeV/u on ^{12}C, ^{40}Ca and ^{58}Ni targets at extremely forward angles including zero degree. Strong excitation of the ΔT_z=+1 analog of the giant dipole resonance is observed and its angular distribution measured over the range $0^o < \theta_{lab} < 3^o$.

J4. H.G. Bohlen, B. Gebauer, D. Kolbert, S. Kubono, W. von Oertzen, P.O. Pellegrin, E. Stiliaris, M. Wilpert, Th. Wilpert, and H. Lenske, H.H. Wolter, and A. Miczaika, N. Alamanos, J. Barrette, B. Berthier, B. Fernandez, J. Gastebois, and C. Berat, M. Buenerd, J.Y. Hostachy, Ph. Martin, and W. Mittig:
The Mechanism of the (^{12}C, ^{12}N) Charge Exchange Reaction on ^{12}C between 30 and 100 MeV/u,
Nucl. Phys. **A488** (1988) 89c-94c

Abstract: The charge exchange reaction $^{12}C(^{12}C,^{12}N)^{12}B$ has been studied at 30 and 70 MeV/u in order to investigate the energy dependence of the two reaction mechanisms involved: the direct charge exchange ant the proton-neutron exchange. Microscopic calculations have been performed for both processes and an almost quantitative description of the data could be achieved. The p-n exchange is strong at low energies and has a maximum at about 30 MeV/u. The direct process dominates for all states only at energies well above 100 MeV/u, but the energy region for the transition from two-step to direct dominance is strongly state dependent.

J3. H.G. Bohlen, B. Gebauer, D. Kolbert, W. von Oertzen, E. Stiliaris, M. Wilpert and Th. Wilpert:
Spectroscopy of ^{9}He with the (^{13}C, ^{13}O)-Reaction on ^{9}Be,
Z. Phys. A - Atomic Nuclei **330** (1988) 227-228

Abstract: First results of the double-charge-exchange reaction $^9Be(^{13}C,^{13}O)^9He$, E_{LAB} = 380 MeV, are presented. The ground state and an excited state at 3.8 MeV are clearly seen. A preliminary value of the 9He mass excess is obtained: 41.5 ± 0.6 MeV. Spectra of the ^9Be (^{13}C, ^{14}O) ^8He -reaction have been measured with high resolution. The ground state transition appears as a pronounced sharp peak, but no other narrow peaks are observed.

J2. E. Stiliaris, H.G. Bohlen, X.S. Chen, B. Gebauer, A. Miczaika, W. von Oertzen, W. Weller and Th. Wilpert:
Mass Measurement and Spectroscopy of ^{57}Cu with the (^{14}C, ^{15}N)-Reaction,
Z. Phys. A - Atomic Nuclei **326** (1987) 139-146

Abstract: The mass of ^{57}Cu has been measured with the $^{58}Ni(^{14}C,^{15}N)$-reaction at 150 MeV incident energy with the Q3D-spectrometer. The reaction has been selected after a careful inspection of the DWBA-expression for the cross section with respect to the highest weighting factors for spins and l-transfer. Cross sections of several μb/sr have been obtained. The Q-value has been measured to be

Q_0=-19.90(4) MeV and the ^{57}Cu mass excess is -47340(40) keV. Four lines of excited states have been observed up to 5.7 MeV. These states have a structure of single particle character, since ^{57}Cu consists of a doubly closed core with N=Z=28 and a proton outside, and states up to the 2d5/2-shell are observed.

J1. W. von Oertzen, E. Adamides, H.G. Bohlen, A. Miczaika, E. Stiliaris, and M. Buenerd, J. Chauvin, D. Lebrun, J.Y. Hostachy, Ph. Martin, G. Perrin and P. de Saintignon:
Selectivity of the (^{13}C,^{13}N), (^{13}C,^{13}B) and (^{12}C,^{12}N) Reactions at 30 MeV/u,
J. Physique **C47** (1986) 175-178

Abstract: Charge exchange reactions induced by ^{12}C and ^{13}C are discussed on a ^{12}C target nucleus. Comparison of cross sections for the population of discrete states and of the continuum gives information which determines the selectivity of these reactions with respect to various modes with and without spin-flip.

Refereed and Other Conference Papers

C41. M. Mikeli, D. Thanasas and E. Stiliaris:
Collimator Study of a γ-Camera System using GATE,
IEEE Nuclear Science Symposium Conference Record M13-360 (2009) 3931-3935
(refereed paper)

Abstract: A collimator study for a small field, high resolution γ-Camera system by means of GATE (GEANT4 Application for Tomographic Emission) simulations is presented in this paper. The aim of this study was the optimal definition and design of the geometrical characteristics of a parallel-hole Pb-collimator, suitable for our γ-Camera system, which is based on the R2486 (HAMAMATSU) Position Sensitive Photomultiplier Tube, for different radio-tracers. The methodology followed two basic steps: (a) A validation phase with an existing parallel hole Pb-collimator of hexagonal structure, which preceded the main study. In this phase, experimentally obtained results for planar images are directly compared to simulated data. A simple phantom structure, consisting of four parallel capillaries filled with ^{99m}Tc water solution, was imaged by the γ-Camera system for several phantom-collimator distances and the measured and Monte Carlo calculated spatial projections were compared. (b) A GATE simulation setup for the main collimator study geometry was constructed and the γ-Camera detector is repeated 36 times (in steps of 10^0) around a ring. This construction allows the simultaneous detection of data for further SPECT reconstruction studies. Simulation data are accumulated for three ellipsoidal sources placed at the center of the ring with different tracer energies, different relative intensities and for several collimator geometries. The collimator sensitivity is tabulated for each tracer energy according to the ratio D/T, where D represents the hole diameter and T the collimator thickness. Finally, the spatial resolution is defined for some basic collimator hole patterns (triangular, square, cylindrical and hexagonal). SPECT images are also reconstructed and the detected resolution is discussed.

C40. S. Angeli and E. Stiliaris:
An Accelerated Algebraic Reconstruction Technique based on the Newton-Raphson Scheme,
IEEE Nuclear Science Symposium Conference Record M09-323 (2009) 3382-3387
(refereed paper)

Abstract: The idea presented here is based on the Newton-Raphson root-finding methodology for localizing the minimum of a function. The proposed algorithm follows the iterative approach of the traditional Algebraic Reconstruction Technique (ART) with the introduction of a new correction method, similar to the Newton-Raphson scheme generalized to several dimensions. The definition of the derivative in this method causes an acceleration in the convergence speed, which results to a respectable drop of the number of iterations needed to minimize the quadratic deviation. The major issue was the definition of a *Cost Function* and its first and second derivative, the equivalent "root" of which would lead to the detection of the local minimum. This *Cost Function* contains the squared difference of the measured and the reconstructed projections in the appropriate matrix notation and takes into account the derivatives with respect to neighbourhood rays and projection angles. Apart from the formalism, the quality of the proposed reconstruction and its convergence speed with respect to the traditional ART is discussed in this work.

C39. D. Thanasas, E. Georgiou, N. Giokaris, A. Karabarbounis, D. Maintas, M. Mikeli, C.N. Papanicolas, L. Ragkousis and E. Stiliaris:
An Analytical Position Correction Algorithm for γ-Camera Planar Images from Resistive Chain Readouts,
IEEE Nuclear Science Symposium Conference Record M05-208 (2009) 2766-2769
(refereed paper)

Abstract: The charge limitation for peripheral Field Of View (FOV) events detected by the most commonly used Position Sensitive Photomultiplier Tubes (PSPMTs) results to spatial distortions and non-uniformities of the obtained planar images. These effects can be corrected with newly

developed sophisticated techniques operating on the charge signals from the individual wires of the multi-anode systems. However, a similar algorithmic approach for the simple case, where the resistive chain readout technique is used and, consequently, the original charge distribution information is lost, is not applicable. In this work the development of a new method to eliminate these distortion effects in the planar images for γ-Camera systems based on resistive chain techniques is presented. The proposed model, which incorporates an a priori knowledge of three parameters related to light diffusion inside the scintillation crystal in use, provides an accurate, analytically calculated estimate of the spatial correction as a function of the primary reconstructed planar position from the resistive chain signals. This algorithm can be used online on an event-by-event basis and can be applied to both, homogeneous and pixelated crystals.

C38. A. Polychronopoulou, D. Thanasas, N. Giokaris, A. Karabarbounis, D. Maintas, C.N. Papanicolas and E. Stiliaris:
Study of the optical properties of continuous and pixelated scintillation crystals,
4th International Conference on Imaging Technologies in Biomedical Sciences, ITBS-2007, IoP,
Journal of Instrumentation **4** (2009) P09002
(refereed paper)

Abstract: The principal goal of this study is to characterize the width of the light distribution for a given number of initial optical photons and to try to express it as a function of the Depth of Interaction (DOI) in the crystal, where the initial optical photons are produced, the size of the initial volume the optical photons occupy before starting the transmission and the geometrical properties of the optical medium that guides the light to the photomultiplier surface. Monte Carlo runs based on the optical simulation package DETECT2000 have been performed. The results indicate that in the case of continuous crystal there is an apparent correlation of the DOI and the width of the light distribution. In the case of pixelated crystals the width of the light distribution seems to be independent of the DOI when the source is located deep in the crystal but there is a strong dependence as the source approaches the PSPMT's entrance window. This correlation of the DOI and the light distribution is not affected by the transverse dimensions of the continuous crystal but in the case of pixelated crystals this correlation is strongly depended on the crystal's aspect ratio. Through this study it also became clear that there is no dependence of the light distribution on the shape of the source.

C37. D. Thanasas, E. Georgiou, N. Giokaris, A. Karabarbounis, D. Maintas, C.N. Papanicolas, A. Polychronopoulou and E. Stiliaris:
A correction method of the spatial distortion in planar images from γ-Camera systems,
4th International Conference on Imaging Technologies in Biomedical Sciences, ITBS-2007, IoP,
Journal of Instrumentation **4** (2009) P06012
(refereed paper)

Abstract: A methodology for correcting spatial distortions in planar images for small Field Of View (FOV) γ-Camera systems based on Position Sensitive Photomultiplier Tubes (PSPMT) and pixelated scintillation crystals is described. The process utilizes a correction matrix whose elements are derived from a prototyped planar image obtained through irradiation of the scintillation crystal by a ^{60}Co point source and without a collimator. The method was applied to several planar images of a SPECT experiment with a simple phantom construction at different detection angles. The tomographic images are obtained using the Maximum-Likelihood Expectation-Maximization (MLEM) reconstruction technique. Corrected and uncorrected images are compared and the applied correction methodology is discussed.

C36. C. Alexandrou, C.N. Papanicolas, E. Stiliaris:
A novel method for the determination of hadron excited states in Lattice QCD applied to the nucleon,
PoS, Lattice 2008, 099 (2008) 1-7
(refereed paper)

Abstract: A novel method for the precise identification and determination of the energies that contribute in the spectral decomposition of lattice correlators is presented. The method is based on statistical concepts and it relies heavily on simulation techniques. The η_c correlator is analyzed within this method and the results obtained are compared to a previous analysis based on Bayesian statistics. An analysis of the nucleon local two-point correlators leads to the identification of the excited states in the positive and negative channels. A discussion on the Roper is included.

C35. M. Mikeli, A. Polychronopoulou, A. Gektin, N. Giokaris, A. Karabarbounis, D. Maintas, C.N. Papanicolas, V. Pedash, D. Thanasas and E. Stiliaris:
A New Position Reconstruction Method for Position Sensitive Photomultipliers,
IEEE Nuclear Science Symposium Conference Record M10-104 (2008) 4736-4741
(refereed paper)

Abstract: A new position reconstruction method for position sensitive photomultiplier tubes is proposed in this work. The algorithm is based on a mathematical model operating on the charge signals recorded from the anode wires of a multi-wired anode system. This method overcomes the usual irregularities produced by the center of gravity algorithm near the edges of the field of view, especially when a homogeneous scintillation crystal is used. According to this method, the amount of the detected charge on a multi-wired anode system is calculated from the light distribution on the photo-cathode assuming superimpose of analytically defined Gauss curves and a constant amplification of the photomultiplier tube. The parameters of this expression are experimentally defined on an event-by-event analysis by performing all required transformations. Data are obtained from a small field, high resolution γ-Camera system with a 16X+16Y multi-wired crossed anode using the Position Sensitive Photomultiplier Tube (PSPMT R2486, HAMAMATSU). The optical photon distribution for each type of the scintillation crystal used in the experiment is calculated with the photon transport system DETECT2000. Systematic measurements for a group of inorganic scintillations crystals of CsI(Tl) with 2mm-4mm-8mm-12mm and 20mm in thickness, as well as of BGO with 2mm-3mm-5mm and 8mm in thickness, have been performed for different radiation sources (^{60}Co, ^{137}Cs, ^{99m}Tc). The experimentally obtained parameters for the produced light distribution inside the various crystals are expressed and categorized according to the crystal geometrical characteristics. The developed method seems to drastically improve the resolution of the reconstructed planar information, even when homogeneous scintillation crystals are used.

C34. D. Thanasas, D. Maintas, E. Georgiou, N. Giokaris, A. Karabarbounis, C.N. Papanicolas and E. Stiliaris:
Correcting Spatial Distortion and non-Uniformity in Planar Images from Gamma Camera Systems,
IEEE Nuclear Science Symposium Conference Record M06-19 (2008) 3711-3714
(refereed paper)

Abstract: In this work a correction method for the spatial distortion and non-uniformity of planar images is presented. It is based on an event-by-event correction algorithm suitable for images obtained from small Field of View (FOV) γ-Camera systems which are equipped with a Position Sensitive PhotoMultiplier Tube (PSPMT). In our study, the γ-Camera system consists of a 3 inch PSPMT with a 16X+16Y crossed wire anode (Model R2486, HAMAMATSU), a 4mm pixelated CsI(Tl) crystal (pixel-width 1mm) and a parallel (hexagonal) hole collimator. The correction of the spatial distortion is based on lookup tables with the coordinates of well defined reference points which are selected during the calibration phase of the system. The reference points are the centres of predefined pixels, well distinguishable at the planar image using a small laboratory ^{60}Co source without collimation. The applied algorithm incorporates 2D-interpolation techniques and has been developed on a full automated graphics environment making use of the *HIGZ* (High Level Interface to Graphics and Zebra) program libraries from CERN. Both correction methods for the spatial distortion and non-uniformity have been applied to planar images obtained from small capillary phantoms filled with water solution of ^{99m}Tc. The method is also extended to tomographic images and the observed SPECT improvement in resolution is discussed.

C33. M. Mikeli, A. Polychronopoulou, N. Giokaris, A. Karabarbounis, D. Maintas, C.N. Papanicolas, D. Thanasas, E. Stiliaris and A. Gektin, V. Pedash:

Optical Properties of Continuous and Pixelated Scintillation Crystals,
17th Symposium of the Hellenic Nuclear Physics Society, University of Ioannina,
HNPS: Advances in Nuclear Physics (2008) 231-240

Abstract: The optical photon distribution produced inside continuous and pixelated scintillation crystals by the absorption of a γ-ray have been studied with the photon transport program DETECT2000. With this program the charge signals recorded by a multi-wired anode system, like the Position Sensitive PhotoMultiplier Tube (PSPMT) of a γ-Camera, are simulated. Based on the analytical parameterization which is fitted to experimental data, a new position reconstruction method for PSPMTs is proposed in this work. Planar images have been reconstructed with the new method and compared to the traditional charge center of gravity technique. Data are obtained from a small field, high resolution γ-Camera system with a multi-wired crossed anode using the R2486 (HAMAMATSU) PSPMT. Systematic studies for continuous and pixelated inorganic scintillation crystals of CsI(Tl) have been performed for different phantom geometries using small capillaries of ^{99m}Tc. The developed method seems to drastically improve the resolution of the reconstructed planar information, even when homogeneous crystals are used.

C32. D. Thanasas, E. Georgiou, N. Giokaris, A. Karabarbounis, D. Maintas, M. Mikeli, C.N. Papanicolas and E. Stiliaris:
A Small Field, High Resolution γ-Camera System dedicated to SPECT Imaging,
17th Symposium of the Hellenic Nuclear Physics Society, University of Ioannina,
HNPS: Advances in Nuclear Physics (2008) 45-51

Abstract: A small field, high resolution γ-Camera system dedicated to radiopharmaceutical research
and other clinical SPECT (Single Photon Emission Computed Tomography) applications is currently being developed in our group. The system is equipped with the 3'' HAMAMATSU R2486 Position Sensitive PhotoMultiplier Tube (PSPMT) with a 16X+16Y-crossed wire anode and various pixelated and homogeneous scintillation crystals. Planar images are created from the recorded charge signals by applying the resistive chain technique. The main part of this work focuses on the development of new correction methods for the improvement of the spatial resolution and the uniformity of the γ-Camera. The spatial distortion correction technique is based on lookup tables with the coordinates of reference points which are selected during the calibration phase of the system for a given set of collimator and scintillation crystal. The applied algorithm incorporates 2D-interpolation techniques and has been developed on a full automated graphics environment making use of the *HIGZ* (High Level Interface to Graphics and ZEBRA) program libraries from CERN. Both correction methods for the spatial distortion and non-uniformity have been applied to phantom images using several combinations of small capillaries filled with water solution of ^{99m}Tc. Comparative studies are shown on planar images for different phantom geometries. The method is also extended to tomographic images and the obtained SPECT improvement in resolution is discussed.

C31. E. Stiliaris and C.N. Papanicolas:
Multipole Extraction: A Novel, Model Independent Method,
AIP Conference Proceedings Vol. **904** (2007) 257-268

Abstract: A novel method for extracting multipole amplitudes in the nucleon resonance region from electro-production data is presented. The method is based on statistical concepts and it relies heavily on Monte Carlo and simulation techniques; it produces precise identification and determination of the contributing multipole amplitudes in the resonance region and for the first time a rigorous determination of the associated experimental uncertainty. The results are demonstrated to be independent of any model bias. The method is applied in the reanalysis of the Q^2=0.127 GeV^2/c^2 Bates and Mainz N→Delta data.

C30. A. Polychronopoulou, D. Thanasas, N. Giokaris, A. Karabarbounis, D. Maintas, C.N. Papanicolas and E. Stiliaris:
Position and Energy Resolution of a γ-Camera based on a Position Sensitive Photomultiplier Tube,
16th Symposium of the Hellenic Nuclear Physics Society, University of Athens,
HNPS: Advances in Nuclear Physics (2007) 172-179

Abstract: Studies of the spatial- and energy-resolution of a small field, high resolution γ-Camera system currently being developed in our laboratory are presented here. The system is based on a cylindrical Position Sensitive Photo-Multiplier Tube (HAMAMATSU R2486) with 32 crossed-wired anodes, arranged in two orthogonal groups. The anode outputs are connected to a resistive current divider network and after pre-amplification are guided to a local digitizing system. A PCI-Analogue to Digital Converter card with a maximum sampling rate of 20MHz and the rest of the Data Acquisition System is controlled by software running on the LabVIEW environment. Position and induced charge of the incident light pulses can be easily reconstructed through a variety of offline algorithms.
In the first part of this study the intrinsic response of the PMT and especially its energy and position resolution is presented. The experimental procedure utilizes the controlled pulse light output of a LED guided through fiber glass directly to the PMT's entrance. The accumulated charge distribution and charge spread as a function of the incident number of photons is studied. In the second part, the response of the integrated γ-Camera system after the application of typical scintillation crystals for ^{99m}Tc radioactive phantoms is measured and analyzed.

C29. N. Giokaris, G. Loudos, D. Maintas, A. Karabarbounis, M. Lembesi, V. Spanoudaki, E. Stiliaris, S. Boukis, N. Sakellios, N. Karakatsanis, A. Gektin, A. Boyarintsev, V. Pedash, V. Gayshan:
Comparison of CsI(Tl) and CsI(Na) partially slotted crystals for high-resolution SPECT imaging,
Proceedings of the 3rd International Conference on Imaging Technologies in Biomedical Sciences, ITBS-2005, Nucl. Instr. and Meth. A **569** (2006) 185-187
(refereed paper)

Abstract: Dedicated systems based on Position Sensitive Photomultiplier Tubes (PSPMTs) coupled to scintillators, have been used over the past years for the construction of compact systems, suitable for applications such as small animal imaging and small organs imaging. Most of the proposed systems are based on fully pixelized scintillators. Previous studies have shown that partially slotted scintillators offer a good compromise between cost, energy resolution and spatial resolution. In this work, the performance of two sets of CsI(Tl) and CsI(Na) partially slotted crystals is compared. Initial results show that CsI(Tl) scintillators are more suitable for gamma-ray detection, since their performance in terms of sensitivity, spatial and energy resolution is superior than that of CsI(Na).

C28. E.P. Pournaras, A. Karabarbounis, C.N. Papanicolas and E. Stiliaris:
The IASA Magnetic Field Mapping (MFM) Project,
Proceedings of the 10th European Particle Accelerator Conference (EPAC06), Edinburgh, Scotland (2006) 2538-2540

Abstract: The design and development of an automatic magnetic field mapping device as supporting equipment for the 10 MeV CW-Linac and its transport system at the Institute of Accelerating Systems & Applications (IASA) is presented. The MFM project aims to totally automate the operation of mapping room temperature magnetic field sources, reconstruct the 3D-field shape and reveal nonlinearities in the fridge field regions. The positioning system covers an area of 50x50 cm^2 with an accuracy of better than 32 μm in both axes; magnetic field measurements, mainly based on Hall Probe, can reach in precision the 10^{-5} value. Several software tools for the visualization of the measured fields and for a direct comparison with theoretical estimates are also presented.

C27. A. Karabarbounis, D. Baltadoros, T. Garetsos, C.N. Papanicolas, E. Stiliaris and A. Zolfaghari:
The IASA Cooling System for the 10 MeV Linac,
Proceedings of the 10th European Particle Accelerator Conference (EPAC06), Edinburgh, Scotland (2006) 1298-1300

Abstract: A de-ionized water cooling system for the IASA room temperature 10 MeV CW Linac has been constructed and successfully installed. Commissioning is undergoing achieving resistivity larger than 5MΩcm with a temperature accuracy of ±0.1^{0}C for all three linacs. Three ways mixing

valves with a stepping capability of one thousand different mixing steps fulfill independently for each linac the required temperature stability and the appropriate resonance frequency to the cavities. The RF requirements for the three linacs is ~200kW provided by a single high power klystron tube capable to deliver up to 500 kW CW at 2380 MHz. The klystron is been cooled with a parallel similar cooling system and a third system cools the aluminum waveguide complex. In this paper we will present the design specifications and results of our preliminary tests. A sophisticated control and interlock system based on EPICS guarantees the proper functioning of the system.

C26. P. Paschalis, N.D. Giokaris, A. Karabarbounis, G.K. Loudos, D. Maintas, C.N. Papanicolas, V. Spanoudaki, Ch. Tsoumpas and E. Stiliaris:
Tomographic Image Reconstruction using Artificial Neural Networks,
Proceedings of the 2nd International Conference on Imaging Technologies in Biomedical Sciences, ITBS-2003, Nucl. Instr. and Meth. A **527** (2004) 211-215
(refereed paper)

Abstract: A new image reconstruction technique based on the usage of an Artificial Neural Network (ANN) is presented. The most crucial factor in designing such a reconstruction system is the network architecture and the number of the input projections needed to reconstruct the image. Although the training phase requires a large amount of input samples and a considerable CPU time, the trained network is characterized by simplicity and quick response. The performance of this ANN is tested using several image patterns. It is intended to be used together with a phantom rotating table and the γ-Camera of the IASA for SPECT image reconstruction.

C25. V. Spanoudaki, N.D. Giokaris, A. Karabarbounis, G.K. Loudos, D. Maintas, C.N. Papanicolas, P. Paschalis, E. Stiliaris:
Design and Development of a Position-Sensitive γ-Camera for SPECT Imaging based on PCI Electronics,
Proceedings of the 2nd International Conference on Imaging Technologies in Biomedical Sciences, ITBS-2003, Nucl. Instr. and Meth. A **527** (2004) 151-156
(refereed paper)

Abstract: A position-sensitive γ-Camera is being currently designed at IASA. This camera will be used experimentally (development mode) in order to obtain an integrated knowledge of its function and perhaps to improve its performance in parallel with an existing one, which has shown a very good performance in phantom, small animal, SPECT technique and is currently being tested for clinical applications. The new system is a combination of a PSPMT (Hamamatsu, R2486-05) and a PMT for simultaneous or independent acquisition of energy and position information, respectively. The resistive chain technique resulting in two signals at each (X, Y) direction will perform the readout of the PSPMT's anode signals; the system is based on PCI electronics. Status of the system's development and the ongoing progress is presented.

C24. N. Giokaris, G. Loudos, D. Maintas, A. Karabarbounis, V. Spanoudaki, E. Stiliaris, S. Boukis, A. Gektin, A. Boyarintsev, V. Pedash, V. Gayshan:
Crystal and Collimator Optimization Studies of a High-Resolution γ-Camera based on a Position Sensitive Photomultiplier,
Proceedings of the 2nd International Conference on Imaging Technologies in Biomedical Sciences, ITBS-2003, Nucl. Instr. and Meth. A **527** (2004) 134-139
(refereed paper)

Abstract: Studies have been performed in order to optimize the collimator and the crystal of a γ-Camera based on a position sensitive photomultiplier with respect its efficiency, its spatial resolution and its cost. Several parallel hole collimators of different thicknesses have been tested and compared to each other. The homogeneous crystals' performance has also been compared to that of a pixelized CsI(Tl) crystal. It is shown that though the spatial resolution of the homogeneous crystals is not as good as that of the pixelized one it is still reasonable and it could probably be improved by the choice of a better position reconstruction algorithm.

C23. G.K. Loudos, N.D. Giokaris, K. Mainta, N. Sakelios, E. Stiliaris, A. Karabarbounis, C.N. Papanicolas, V. Spanoudaki, K.S. Nikita, N.K. Uzunoglu, S.C. Archimandritis, A.D. Varvarigou, K.N. Stefanis, S. Majewski, A. Weisenberger, R. Pani, D. Maintas:
High-Resolution and High-Sensitivity SPECT Imaging of Breast Phantoms,
Proceedings of the 2nd International Conference on Imaging Technologies in Biomedical Sciences, ITBS-2003, Nucl. Instr. and Meth. A **527** (2004) 97--101
(refereed paper)

Abstract: A small field of view gamma camera based on a Position Sensitive Photomultiplier Tube has been used for tomoscintigraphic imaging of breast phantoms. The breast phantoms consist of small hot quantities of 99mTc placed in a plastic pot filled with a lower concentration ^{99m}Tc solution. The volume of the hot quantities varied from 0.5 to 0.25 ml and the target to background activity ratio varied from 3:1 to 5:1. The impact of the acquisition time per projection and the number of projections on image quality has been investigated.

C22. G.K. Fanourakis, T. Geralis, K. Kousouris, K. Zachariadou, I. Giomataris, N. Giokaris, G. Loudos, M. Lebessi, E. Stiliaris:
The Use of the Micromegas Technology for a New Imaging System,
Proceedings of the 2nd International Conference on Imaging Technologies in Biomedical Sciences, ITBS-2003, Nucl. Instr. and Meth. A **527** (2004) 62-67
(refereed paper)

Abstract: The Micromegas (Micromesh Gaseous) detector technology was developed by I. Giomataris and G. Charpak, in the mid 90s, for applications in the field of experimental Particle Physics. The most recent development is a novel Micromegas detector designed to detect photons of energies 1–10 keV (X-ray range), for a discovery experiment of the hypothetical particles called axions, installed and currently taking data at CERN (the European Laboratory for Particle Research in Geneva). This detector has an X–Y readout capability of resolution less than 100μm, an energy resolution down to 14%, for this energy range, and an overall efficiency of 70%. With planned modifications, similar performances can be achieved for operation in the energy regime of the technetium gammas. This could lead to a novel γ-ray imaging device with spatial resolution in the sub-millimetre range. Initial results are presented obtained using the current detector with a parallel hole collimator to image thin capillary phantoms filled with a ^{99m}Tc water solution.

C21. M.P. Tzamtzi, D. Economou, P. Phinou and E. Stiliaris:
The Personnel Safety System at IASA,
Proceedings of the Seventh European Particle Accelerator Conference EPAC 2000, Vienna, Austria, IoP, (2000) 2405-2407

Abstract: This paper describes the design philosophy, the logic and the implementation of the Personnel Safety System (PSS) at the Institute of Accelerating Systems and Applications (IASA). The PSS aims to protect personnel from potential hazards coming from the operation of the Race Track Microtron electron accelerator (240MeV), which is under construction. The implementation of the IASA's PSS is based on the Series One Programmable Controller of General Electric. The PSS's reliability is guaranteed by redundancy, multiplicity and diversity.

C20. E. Stiliaris and E. Meintanis:
Estimation of Transversal Emittance using an Artificial Neural Network,
Proceedings of the Seventh European Particle Accelerator Conference EPAC 2000, Vienna, Austria, IoP, (2000) 1812-1814

Abstract: An expert system, utilizing an Artificial Neural Network (ANN), is under development. The ultimate goal of the project is the "one-shot" transversal emittance estimation of the e-beam in the 100-keV line of the IASA Racetrack
Microtron. Input data consists of two video grabs from view screens, as well as the value of the current in a solenoid located between them. Simulations of the line, using the *PARMELA* code, have been providing training and test data to optimize a neural network. Current progress in the project, including the response of the system to real world data and the automation of data feeding, will be

discussed in the paper.

C19. E. Stiliaris, D. Baltadoros, S. Cohen, D. Economou, T.A. Filippas, E.N. Gazis, N. Giokaris, A. Karabarbounis, D. Maroulis, N.H. Papadakis, C.N. Papanicolas, P. Phinou, M. Tzamtzi, N. Uzunoglou, H. Herminghaus, A. Zolfaghari:
The IASA 10MeV CW-Linac,
Proceedings of the Seventh European Particle Accelerator Conference EPAC 2000, Vienna, Austria, IoP, (2000) 866-868

Abstract: The installation of a 10 MeV electron injector as a Project for the RaceTrack Microtron at the Institute of Accelerating Systems & Applications (IASA) is presented. This Maquette line is composed by a 5 MeV injector linac with RF structures of the side-coupled type, followed by a 4m-booster section of the same type. This system will provide a realistic test facility for all subsystems (power station, klystron, wave-guiding, chiller, control, interlock and safety system), with exception of recirculations of the IASA cascade RTM facility. It is envisioned that its beams will be used for applied physics research.

C18. E. Stiliaris, D. Baltadoros, M. Barbarosou, S. Cohen, D. Economou, T.A. Filippas, E.N. Gazis, N. Giokaris, H. Herminghaus, A. Karabarbounis, D. Maroulis, E. Meintanis, N.H. Papadakis, C.N. Papanicolas, P. Phinou, N. Sparveris, N. Uzunoglou, A. Zolfaghari:
The IASA RaceTrack Microtron Facility,
Proceedings of the XVth Particles and Nuclei International Conference, PANIC99, Uppsala 1999, Nucl. Phys. **A663** & **664** (2000) 1095c-1098c
(refereed paper)

Abstract: The design of the 240 MeV two-stage CW RaceTrack Microtron of the Institute of Accelerating Systems & Applications (IASA) is presented. The present status on the performance of the already installed 100 keV line, the diagnostic line for measuring the transverse beam emittance and the on-going installation of the complete injector is discussed. Plans for a simple and very cost effective upgrade to a 650 MeV two-stage cascaded RTM machine are also presented.

C17. F. Scarlat, M. Facina, C.D. Dinca, V. Manu, A. Karabarbounis, E. Stiliaris, J. Papadakis and C. Trikalinos:
Metal grating efficiencies for Smith-Purcell radiation in relativistic regime,
6th International Symposium of Optoelectronics SIOEL, Bucharest, Romania, Sept. 22-24, 1999, published in Proc. SPIE, Vol. 4068 (2000) 303-309
(refereed paper)

Abstract: This paper presents the efficiency of Smith-Purcell radiation generation for lamellar and triangular metal gratings (MG) in H-polarization. The efficiency was calculated by the modal expansion method for lamellar MG and the improved point matching method for triangular MG, respectively. Most important MG parameters involved in the calculation were: the space period, the total number of grooves, the profile and the shape of the groove, and the geometry of the reflecting surface. Calculations were performed for relativistic electron beams with energies in 1-50 MeV domains. The emission angle of coherent SP radiation depending on MG and REB parameters is also presented.

C16. A. Karabarbounis, E. Stiliaris, J. Papadakis, C. Trikalinos, F. Scarlat, M. Facina, C.D. Dinca and V. Manu:
Monte Carlo calculations and experimental setup for a Smith-Purcell experiment in Bucharest and Athens,
4th International Symposium for Relativistic Electron Beams in Periodic Structures, Lake Baikal, Russia, Sept. 13-16, 1999, Nucl. Instr. and Meth. **B 173** (2001) 99-103

(refereed paper)

Abstract: A study of energy spectra (Smith-Purcell power, energy peaks, and shape of the spectra) is performed using a Monte-Carlo simulation method. This was done in order to examine the dependence from the experimental parameters. The setup for an experiment looking for Smith-Purcell radiation in the IR and FIR region is also presented. Experiment is taking place at the beginning of year 2000 in Bucharest (Romania) at the National Institute for Laser, Plasma and Radiation Physics, at the betatron facilities of the Electron Accelerator Laboratory with an electron beam up to 30 MeV. This experiment will be continued later on in Athens (Greece), at the Institute of Accelerating Systems and Applications (IASA) with a linac delivering up to 10 MeV CW electron beam.

C15. F. Scarlat, M. Facina, C.D. Dinca, V. Manu, A. Karabarbounis, E. Stiliaris, J. Papadakis, C. Trikalinos and O. Haeberle:
The Improved Point Matching Method for triangular metal gratings,
4th International Symposium for Relativistic Electron Beams in Periodic Structures, Lake Baikal, Russia, Sept. 13-16, 1999, Nucl. Instr. and Meth. **B 173** (2001) 93-98
(refereed paper)

Abstract: In this paper, we present the ``Point Matching Method'' (PMM) adapted for the calculation of Smith-Purcell (SP) radiation parameters in H-polarization, generated by Relativistic Electron Beams (REB) passing close to a triangular metal grating. A truncated expression $H_{y,n}^{d}(N;\beta,\omega)$ was used in order to find the coefficients $H_{y,n}^{d}(\beta,\omega)$ in the infinite Rayleigh expansion of the diffracted field of a moving electron. A linear system of 2N+1 equations was solved, increasing the number N of harmonics until convergence solutions were achieved. When N→∞ then $\lim_{N\to\infty} H_{y,n}^{d}(N;\beta,\omega) = H_{y,n}^{d}(\beta,\omega)$ and the diffracted field can be calculated. SP radiation factors were calculated using the modified PMM for electron energies in 1-30 MeV domain and metal gratings with period length in 1-10 mm range.

C14. A. Hawkins, W. North, C. Wolcott, A. Zolfaghari, D.P. Economou, D. Baltadoros, A.V. Filippas, A. Karabarbounis, C.N. Papanicolas, E. Stiliaris, N. Uzunoglou:
The S-Band Transmitter Design for the Institute of Accelerating Systems and Applications Racetrack Microtron,
The 1999 Particle Accelerator Conference PAC99, New York, IEEE (1999) 1037-1039

Abstract: A high-power CW (continuous-wave) source, at 2380 MHz, for the IASA (Institute of Accelerating Systems and Applications), (Athens, Greece), Microtron is based on the CPI (Communications and Power Industries) type VKS-8270 multi-cavity klystron. The high-level DC power conditioning for the klystron uses an existing high-voltage transformer-rectifier (HVPS) and variable-voltage transformer (VVT), designed to operate from 60 Hz power, whereas the local power is at 50 Hz. Other features include a new electronic crowbar system and high-speed primary-power disconnect.

C13. M. Barbarosou, S. Cohen, D. Economou, T.A. Filippas, E.N. Gazis, N. Giokaris, A. Karabarbounis, D. Maroulis, N.H. Papadakis, C.N. Papanicolas, N. Patavalis, P. Phinou, H. Rahmani, E. Stiliaris, N. Uzunoglou, N. Vodinas, H. Herminghaus and A. Zolfaghari:
The IASA RaceTrack Microtron Facility: A Progress Report,
Proceedings of the Sixth European Particle Accelerator Conference EPAC98, Stockholm, IoP, (1998) 752-754

Abstract: The design of the 240 MeV two-stage CW cascade Racetrack Microtron (RTM) accelerator of the Institute of Accelerating Systems & Applications (IASA) is presented. The present status on the performance of the already installed100 keV line and the diagnostic line for measuring the

transverse beam emittance is discussed. Further developments are also briefly outlined.

C12. E. Stiliaris, H. Avramopoulos, D. Baltadoros, M. Barbarosou, S. Cohen, D. Economou, T.A. Filippas, E.N. Gazis, A. Karabarbounis, M. Malagari, D. Maroulis, N.H. Papadakis, C.N. Papanicolas, N. Patavalis, P. Phinou, H. Rahmani, N. Sparveris, N. Uzunoglou, N. Vodinas and H. Herminghaus:
The IASA RaceTrack Microtron Facility, A Progress Report,
Proceedings of the 1997 Particle Accelerator Conference PAC97, Vancouver, B.C. Canada, IEEE, (1998) 1042-1044

Abstract: The Institute of Accelerating Systems and Applications (IASA) is pursuing research and facilitates postgraduate studies in traditional and cross-disciplinary areas where accelerators play an important role. The first major facility of IASA, now under construction, is a 242 MeV two-stage CW cascade Microtron. During the ongoing period of civil construction a staging area has been set up for the installation of the injector and the testing of several key subsystems. A progress report on this project is presented here.

C11. N. Sparveris, A.V. Filippas, H. Herminghaus, K. Hizanidis, A. Karabarbounis, N. Papadakis, C.N. Papanicolas, E. Stiliaris, N.P. Vodinas:
Optics for the IASA CW RTM,
Proceedings of the 7th Hellenic Symposium on Nuclear Physics, Athens, Greece, 1996, Macedonian Publications (1997) 113-119

Abstract: A Continuous Wave Cascade Racetrack Microtron (RTM) is being built at the Institute of Accelerating Systems and Applications (IASA). Making optimal use of the available equipment (obtained from NIST and the University of Illinois), a two-stage ν=1Cascade scheme with optics similar to those of the Mainz RTM was adopted. The IASA CW RTM will provide a variable output energy from 6.5 to 246 MeV, with current intensity exceeding 100μA. The LANL side-coupled linear accelerator structure operates at the RF frequency of 2380 MHz. The new design provides excellent emittance characteristics. Details of the optics design and results of the 100keV beam Line of the Athens CW Cascade RTM are presented.

C10. E. Stiliaris, M. Barbarosou, T.A. Filippas, E.N. Gazis, A. Karabarbounis, C.N. Papanicolas, N. Patavalis, H. Rahmani:
Control System Implementation for the IASA Microtron,
Proceedings of the 7th Hellenic Symposium on Nuclear Physics, Athens, Greece, 1996, Macedonian Publications (1997) 106-112

Abstract: A progress report on the architectural design and implementation of the Control System for the Racetrack Microtron at the Institute of Accelerating Systems and Applications (IASA) in Athens, Greece is presented. The Control System for the IASA CW Microtron is being developed on the Experimental Physics and Industrial Control System (EPICS) environment. Since top priority for this project is the construction and commissioning of the Microtron's injector, emphasis is being given to the definition and refinement of the Control Architecture and its realization for the injector. The experience gained from the Control System at the injector will guide the further development of the Control System for the entire Microtron.

C9. E. Stiliaris, M. Barbarosou, E.N. Gazis, A. Karabarbounis, D. Maroulis, C.N. Papanicolas, N. Patavalis, H. Rahmani:
Control System Implementation for the IASA Microtron,
Proceedings of the Fifth European Particle Accelerator Conference EPAC96, Sitges (Barcelona), IoP, (1996) 1784-1786

Abstract: A progress report on the architectural design and implementation of the Control System for the Racetrack Microtron at the Institute of Accelerating Systems and Applications (IASA) in Athens, Greece is presented. The Control System for the IASA CW Microtron is being developed on the Experimental Physics and Industrial Control System (EPICS) environment. Since top priority for

this project is the construction and commissioning of the Microtron's injector, emphasis is being given to the definition and refinement of the Control Architecture and its realization for the injector. The experience gained from the Control System at the injector will guide the further development of the Control System for the entire Microtron.

C8. A. Karabarbounis, H. Avramopoulos, D. Economou, A.V. Filippas, T.A. Filippas, E. Gazis, K. Hizanidis, D. Maroulis, N. Papadakis, J. Papakonstantinou, C.N. Papanicolas, H. Rahmani, E. Stiliaris, C. Trikalinos, N. Uzunoglou, N. Vodinas:
The IASA Racetrack Microtron Facility,
Proceedings of the Fifth European Particle Accelerator Conference EPAC96, Sitges (Barcelona), IoP, (1996) 560-562

Abstract: The Institute of Accelerating Systems and Applications (IASA) is pursuing research and facilitates postgraduate studies in traditional and cross-disciplinary areas where accelerators play an important role. The first major facility of IASA, now under construction, is a 246 MeV two-stage CW Cascade Microtron. The planned experimental programs and facilities include nuclear and particle physics, nuclear medicine, archeometry and material science.

C7. A.V. Filippas, H. Herminghaus, K. Hizanidis, A. Karabarbounis, N.H. Papadakis, C.N. Papanicolas, N. Sparveris, E. Stiliaris, N.P. Vodinas, and V.I. Shvedunov, I.S. Surma, A.V. Tiunov:
Optics for the IASA CW RTM,
Proceedings of the Fifth European Particle Accelerator Conference EPAC96, Sitges (Barcelona), IoP, (1996) 557-559

Abstract: A Continuous Wave Cascade Racetrack Microtron (RTM) is being built at the Institute of Accelerating Systems and Applications (IASA). Making optimal use of the available equipment (obtained from NIST and the University of Illinois), a two-stage ν=1 Cascade scheme with optics similar to those of the Mainz RTM was adopted. The IASA CW RTM will provide variable output energy from 6.5 to 246 MeV, with current intensity exceeding 100μA. The LANL side-coupled linear accelerator structure operates at the RF frequency of 2380 MHz. The new design provides excellent emittance characteristics. Details of the optics design, stability and operation criteria of the Athens CW Cascade RTM are presented.

C6. H. Avramopoulos, M. Barbarosou, D. Economou, A.V. Filippas, T.A. Filippas, E.N. Gazis, K. Hizanidis, A. Karabarbounis, K. Krempounis, Ch. Markopoulos, D. Maroulis, N. Papadakis, C.N. Papanicolas, N. Patavalis, H. Rahmani, N. Sparveris, E. Stiliaris, C. Trikalinos, N. Uzunoglou, C. Vellidis, N. Vodinas:
Institute of Accelerating Systems and Applications (IASA) Progress Report,
1996 Gordon Research Conference on Photonuclear Reactions, Tilton, NH, USA, 1996

Abstract: The Institute of Accelerating Systems and Applications (IASA) is an autonomous research Institute operating under the auspices of the Ministry of Education in Greece. It has been in existence since the summer of 1994 and it is based in Athens Greece. It is affiliated with six departments (Medicine, Physics, Electrical and Computer Engineering, Chemical Engineering and General Sciences) of the National and Kapodistrian University of Athens (NKUA) and the National Technical University of Athens (NTUA). It is open to researchers from the international community and access is determined purely on scientific merit.
IASA is pursuing research and facilitates postgraduate studies in traditional and cross-disciplinary areas where accelerators play an important role. The first major facility of IASA, now under construction, is a 246 MeV two-stage CW cascade racetrack Microtron. The planned experimental programs and facilities for IASA Microtron include nuclear and particle physics, nuclear medicine, archeometry and material science.

C5. H.G. Bohlen, P. Froebrich, D.T. Khoa, D. Kolbert, W. von Oertzen, H. Rossner, E. Stiliaris, M. Wilpert and Th. Wilpert:

Rainbow Structures in the Scattering of ^{16}O on ^{16}O at E_L = 350 MeV,
Proceedings of the IV International Conference on Nucleus-Nucleus Collisions, Kanazawa, Japan 1991, p.158

C4. H.G. Bohlen, M. Braeunig, P. Froebrich, B. Gebauer, D. Kolbert, W. von Oertzen, E. Stiliaris, M. Wilpert, Th. Wilpert, E. Adamides:
Direct Mechanisms in the Interaction of Nuclei in the Range of 20 MeV/u up to 100 MeV/u,
Proceedings of the International Symposium on Heavy Ion Research with Magnetic Spectrographs, East Lansing, Michigan, USA, 1989, ed. N. Anantaraman and B. Sherrill, pp 144-173

C3. S. Kubono, W. von Oertzen, H.G. Bohlen, E. Stiliaris, Y. Sakuragi, M. Kamimura:
3-α Fragmentation Processes of 12C at E/u = 10-30 MeV,
RIKEN - Symposium on Heavy-Ion Collisions, Shimoda, Japan, 1987

Abstract: Energy dependence of 3α fragmentation processes has been studied in the scattering of $^{12}C+^{12}C$ at E/u=10-30 MeV. The dynamic polarization potential induced by the fragmentation processes indicates a rapid increase of the normalization from 8 to 35% for the real part of the elastic diagonal potential in this energy region.

C2. H.G. Bohlen, B. Gebauer, A. Miczaika, W. von Oertzen, E. Stiliaris, and H. Lenske, H.H. Wolter:
Charge-Exchange Reactions with Heavy-Ions and Other Studies at the Berlin Q3D-Spectrometer,
Proceedings of the Beijing International Symposium on Physics at Tandem,
Beijing 1986, pp 199-214, edt Jiang Chenlie *et al.*, World Scientific Pub. Co., Singapore, 1987

C1. W. von Oertzen, E. Adamides, H.G. Bohlen, A. Miczaika, E. Stiliaris, and M. Buenerd, J. Chauvin, D. Lebrun, J.Y. Hostachy, Ph. Martin, G. Perrin and P. de Saintignon:
The charge exchange reactions (^{13}C,^{13}N) and (^{12}C,^{12}N) at energies of 10-45 MeV/u,
Proceedings of the International Nuclear Physics Conference, Harrogate, England, 1986
(Bristol, England: IOP 1987), p.163 Vol. 1

List of Talks

T29. Department of Physics, University of Cyprus
Nicosia, Cyprus, 15 April 2011
Optimized Techniques for High Resolution SPECT Imaging
Invited Talk

T28. Hellenic Physical Society
Athens, 18 December 2009
Proton: A Basic Building Block of our Cosmos
Talk for the High School Students

T27. LINKSCEEM Users Meeting
OTE Academy, Athens, 9 February 2009
Medical Imaging with High Performance Computers
Invited Talk

T26. Physics Department Research Activities, University of Athens
Athens, Greece, 26-27 May 2008
Hadronic Physics
SPECT Imaging with a γ-Camera
Group Report

T25. LINKSCEEM 1st Users Meeting
The Cyprus Institute, Nicosia, Cyprus, 8 April 2008
Medical Imaging: Emission Tomography at the IASA SPECT-Lab
Invited Talk

T24. Department of Physics, University of Cyprus
Nicosia, Cyprus, 5 July 2007
A Model Independent Analysis Scheme:
Extraction of Multipole Amplitudes in the Nucleon Resonance Region
Invited Talk

T23. PET-SPECT-Radio Isotopes in Greece, Workshop
General Secretary of Research & Development Hellas, Athens, 26 June 2006
SPECT Imaging Development
Invited Talk

T22. Bank of Cyprus Oncology Center (BOCOC)
Nicosia, Cyprus, 9 June, 2006
The SPECT Research Program of IASA
Invited Talk

T21. International Workshop on the "SHAPE OF HADRONS"
27-29 Apr, 2006 Athens, Greece
Multipole Extraction: Sensitivities and Model Errors
Invited Talk

T20. Physics Department, University of Athens
Athens, Greece, 29 March 2005
Nuclear Medicine: Imaging Applications at IASA
Seminar

T19. HADRON DEFORMATION WORKSHOP
M.I.T. Stata Center, LNS, Cambridge, MA, USA, 7-9 August, 2004
$\gamma^* N \rightarrow \Delta$ Bates Results
E. Stiliaris for the OOPS Collaboration
Invited Talk

T18. International Workshop on Parity Violation and Hadronic Structure (PAVI04)
Laboratoire de Physique Subatomique et de Cosmologie, Grenoble, France, 8-11 June 2004
Parity Violation in Nuclear Systems:
Experimental Considerations in the Deuteron Photodisintegration with Polarized Photons
Invited Talk

T17. Electromagnetic Interactions with Nucleons and Nuclei (EINN03)
Workshop on Nucleon Form Factors and Parity Violation
Athens & Santorini, Greece, 6-12 October 2003
Study of the Parity-Non-Conserving (PNC) Force between Nucleons with Low Energy Beams
Invited Talk

T16. Physics Department, University of Athens
Athens, Greece, October 2000
Study of the Parity Violation in the NN-Interaction with Low Energy Electron Beams
Seminar

T15. CERN Accelerator School, Introductory Course on Accelerator Physics, (CAS2000)
Loutraki, Greece, 2000
Microtrons
Invited Seminar

T14. XVth Particles and Nuclei International Conference (PANIC99)
Uppsala, Sweden, 1999
The IASA RaceTrack Microtron Facility
Group Report

T13. 1997 Particle Accelerator Conference (PAC97)
Vancouver, B.C., Canada, 1997
The EPICS Control System at IASA
Talk in the EPICS Collaboration Meeting

T12. Physics Department, University of Athens
Athens, Greece, November 1996
Heavy Ion Scattering and the Nuclear Rainbow Effect
Seminar

T11. 7th Symposium on Nuclear Physics, Hellenic Nuclear Physics Society
Athens, Greece, 1996
Control System Implementation for the IASA Microtron
Talk

T10. Physics Department, University of Hamburg

Hamburg, Germany, 1993
Applications of Artificial Neural Networks in Nuclear and High Energy Physics
Seminar

T9. Physics Department, University of Freiburg
Freiburg, Germany, December 1991
Nuclear Rainbow Effects in the Scattering of Heavy Ions
Invited Talk

T8. Spring meeting of the Deutsche Physikalische Gesellschaft
Bonn, Germany, 1989
Nuclear Rainbow Scattering and Airy Structures in Heavy Ion Scattering
Group Report

T7. Freie Universität Berlin, Berlin, Germany
February, 1989
Refraction and the Nuclear Rainbow Scattering of Heavy Ions
Disputationsvortrag

T6. Hahn-Meitner-Institute, Berlin, Germany
December, 1988
Refractive Effects in the Scattering of Heavy Ions
Colloquium

T5. Spring meeting of the Deutsche Physikalische Gesellschaft
Berlin, Germany, 1988
Investigation of the Refractive Scattering in the System $^{16}O+^{16}O$, 22 MeV/u
Talk

T4. 19th Summer School on Nuclear Physics
Mikolajki, Poland, 1987
Refractive Effects in the Interaction of ^{12}C and ^{20}Ne with ^{12}C at 20 MeV/u
Group Report

T3. Hahn-Meitner-Institute, Berlin, Germany
July, 1987
Refractive Scattering in the System ^{20}Ne + ^{12}C at 20 MeV/u
Seminar

T2. Hahn-Meitner-Institute, Berlin, Germany
February, 1984
Mass Measurement and Spectroscopy of the Exotic Nucleus ^{57}Cu
Seminar

T1. Hahn-Meitner-Institute, Berlin, Germany
October, 1984
Spectroscopy of Exotic Nuclei with the Q3D Magnetic Spectrograph
Seminar

Poster Presentations

P28. M. Mikeli, D. Thanasas and E. Stiliaris:
Collimator Study of a γ-Camera System using GATE,
Nuclear Science Symposium – Medical Imaging Conference, IEEE-2009
25-31 October 2009, Orlando, Florida, USA

P27. S. Angeli and E. Stiliaris:
An Accelerated Algebraic Reconstruction Technique based on the Newton-Raphson Scheme,
Nuclear Science Symposium – Medical Imaging Conference, IEEE-2009
25-31 October 2009, Orlando, Florida, USA

P26. D. Thanasas, E. Georgiou, N. Giokaris, A. Karabarbounis, D. Maintas, M. Mikeli, C.N. Papanicolas, L. Ragkousis and E. Stiliaris:
An Analytical Position Correction Algorithm for γ-Camera Planar Images from Resistive Chain Readouts,
Nuclear Science Symposium – Medical Imaging Conference, IEEE-2009
25-31 October 2009, Orlando, Florida, USA

P25. M. Mikeli, L. Ragkousis, D. Thanasas and E. Stiliaris:
Optical Transport Study for γ-Camera Imaging Devices,
Conference on Imaging Technologies in Biomedical Sciences, ITBS09
Milos Island, Greece, 13-16 September 2009

P24. M. Mikeli, A. Polychronopoulou, A. Gektin, N. Giokaris, A. Karabarbounis, D. Maintas, C.N. Papanicolas, V. Pedash,
A New Position Reconstruction Method for Position Sensitive Photomultipliers,
Nuclear Science Symposium – Medical Imaging Conference, IEEE-2008
19-25 October 2008, Dresden, Germany

P23. D. Thanasas, D. Maintas, E. Georgiou, N. Giokaris, A. Karabarbounis, C.N. Papanicolas, and E. Stiliaris:
Correcting Spatial Distortion and non-Uniformity in Planar Images from γ-Camera Systems,
Annual Congress of the European Association of Nuclear Medicine, EANM 2008
12-15 October 2008, Munich, Germany

P22. E. Stiliaris, M. Mikeli, A. Polychronopoulou, N. Giokaris, A. Karabarbounis, D. Maintas, C.N. Papanicolas, D. Thanasas and A. Gektin, V. Pedash:
Position Reconstruction from Multi-Anode Photomultiplier Signals,
Annual Congress of the European Association of Nuclear Medicine, EANM 2008
12-15 October 2008, Munich, Germany

P21. M. Mikeli, A. Polychronopoulou, N. Giokaris, A. Gektin, A. Karabarbounis, D. Maintas, C.N. Papanicolas, V. Pedash, D. Thanasas and E. Stiliaris:
Optical Properties of Continuous and Pixelated Scintillation Crystals,
17th Symposium of the Hellenic Nuclear Physics Society
University of Ioannina, 30-31 May 2008

P20. A. Polychronopoulou, D. Thanasas, N.D. Giokaris, A. Karabarbounis, D. Maintas, C.N. Papanicolas and E. Stiliaris:
Study of the Optical Properties of Both Continuous and Pixelated Scintillation

Crystals,
Conference on Imaging Technologies in Biomedical Sciences, ITBS07
Milos Island, Greece, 22-28 September 2007

P19. A. Karabarbounis, D. Baltadoros, T. Garetsos, C.N. Papanicolas, E. Stiliaris and A. Zolfaghari:
The IASA Cooling System for the 10 MeV Linac,
10th European Particle Accelerator Conference EPAC 2006
Edinburgh, Scotland, 26-30 June 2006

P18. E.P. Pournaras, A. Karabarbounis, C.N. Papanicolas and E. Stiliaris:
The IASA Magnetic Field Mapping (MFM) Project,
10th European Particle Accelerator Conference EPAC 2006
Edinburgh, Scotland, 26-30 June 2006

P17. L. Souma, P. Paschalis, V. Spanoudaki and E. Stiliaris:
Position Reconstruction from Multi-Anode Photomultiplier Charge Signals,
Conference on Imaging Technologies in Biomedical Sciences, ITBS05
Milos Island, Greece, 25-29 September 2005

P16. A. Polychronopoulou, N.D. Giokaris, A. Karabarbounis, D. Maintas, C.N. Papanicolas, P. Paschalis, V. Spanoudaki and E. Stiliaris:
Intrinsic Response of a Position Sensitive Photomultiplier Tube used in γ-Cameras,
Conference on Imaging Technologies in Biomedical Sciences, ITBS05
Milos Island, Greece, 25-29 September 2005

P15. V. Spanoudaki, N.D. Giokaris, A. Karabarbounis, G.K. Loudos, D. Maintas, C.N. Papanicolas, P. Paschalis, E. Stiliaris:
Design and Development of a Position-Sensitive γ-Camera for SPECT Imaging based on PCI electronics,
Conference on Imaging Technologies in Biomedical Sciences, ITBS03
Athens & Milos Island, Greece, 26-30 May 2003

P14. P. Paschalis, N.D. Giokaris, A. Karabarbounis, G.K. Loudos, D. Maintas, C.N. Papanicolas, V. Spanoudaki, Ch. Tsoumpas, E. Stiliaris:
Tomographic Image Reconstruction Using Artificial Neural Networks,
Conference on Imaging Technologies in Biomedical Sciences, ITBS03
Athens & Milos Island, Greece, 26-30 May 2003

P13. G.K. Loudos, K.S. Nikita, N.A. Mouravliansky, N.K. Uzunoglou, G.K. Matsopoulos, N.D. Giokaris, A. Karabarbounis, C.N. Papanicolas, E. Stiliaris, S.C. Archimandritis, A.D. Varvarigou, D. Maintas,
K. Stefanis:
An Assessment of Position Sensitive Photomultiplier Tubes for High Resolution 3D Imaging,
Nuclear Science Symposium - Medical Imaging Conference, IEEE-2000
Lyon, France, 2000

P12. S.C. Archimandritis, N.D. Giokaris, A. Karabarbounis, G.K. Loudos, D. Maintas, S. Majewski, K.S. Nikita, R. Pani, C.N. Papanicolas, F. Scopinaro, C.N. Stefanis, E. Stiliaris, N.K. Uzunoglou, A.D. Varvarigou, A. Weisenberger, R. Wojcik:
Development of a High Resolution SPECT Gamma Camera for Small Animals Imaging,
Congress of the European Association of Nuclear Medicine (EANM2000)

Paris, France, 2000

P11. M.P. Tzamtzi, D. Economou, P. Phinou and E. Stiliaris:
The Personnel Safety System at IASA,
Seventh European Particle Accelerator Conference EPAC 2000
Vienna, Austria, 2000

P10. E. Stiliaris and E. Meintanis:
Estimation of Transversal Emittance using an Artificial Neural Network,
Seventh European Particle Accelerator Conference EPAC 2000
Vienna, Austria, 2000

P9. E. Stiliaris, D. Baltadoros, S. Cohen, D. Economou, T.A. Filippas, E.N. Gazis, N. Giokaris, A. Karabarbounis, D. Maroulis, N.H. Papadakis, C.N. Papanicolas, P. Phinou, M. Tzamtzi, N. Uzunoglou, H. Herminghaus, A. Zolfaghari:
The IASA 10MeV CW-Linac,
Seventh European Particle Accelerator Conference EPAC 2000
Vienna, Austria, 2000

P8. S.C. Archimandritis, N.D. Giokaris, A. Karabarbounis, G.K. Loudos, D. Maintas, S. Majewski, K.S. Nikita, R. Pani, C.N. Papanicolas, F. Scopinaro, C.N. Stefanis, E. Stiliaris, N.K. Uzunoglou, A.D. Varvarigou, A. Weisenberger, R. Wojcik:
A High Resolution Gamma-Ray Camera for Small Animals Imaging,
8th Pisa Meeting on Advanced Detectors
Isola D'Elba, Italy, 2000

P7. E. Stiliaris, H. Avramopoulos, D. Baltadoros, M. Barbarosou, S. Cohen, D. Economou, T.A. Filippas, E.N. Gazis, A. Karabarbounis, M. Malagari, D. Maroulis, N.H. Papadakis, C.N. Papanicolas, N. Patavalis, P. Phinou, H. Rahmani, N. Sparveris, N. Uzunoglou, N. Vodinas and H. Herminghaus:
The IASA RaceTrack Microtron Facility, A Progress Report,
1997 Particle Accelerator Conference PAC97
Vancouver, B.C. Canada, 1997

P6. A. Karabarbounis, H. Avramopoulos, D. Economou, A.V. Filippa, T.A. Filippas, E.N. Gazis, K. Hizanidis, D. Maroulis, N. Papadakis, C.N. Papanicolas, H. Rahmani, E. Stiliaris, C. Trikalinos, N. Uzunoglou, N. Vodinas:
The IASA RaceTrack Microtron Facility,
12th International Symposium on High-Energy Spin Physics (SPIN96)
Amsterdam, The Netherlands, 1996

P5. E. Stiliaris, M. Barbarosou, E.N. Gazis, A. Karabarbounis, D. Maroulis, C.N. Papanicolas, N. Patavalis, H. Rahmani:
Control System Implementation for the IASA Microtron,
Fifth European Particle Accelerator Conference EPAC96
Sitges (Barcelona), Spain, 1996

P4. E. Stiliaris:
A Nuclear Mass Model based on a Neural Network,
7th Symposium on Nuclear Physics, Hellenic Nuclear Physics Society
Athens, Greece, 1996

P3. E. Stiliaris (ZEUS Collaboration):
BOOST: An Interactive Graphical Package for the Visualization of Lorentz

Transformations,
European Commission Conference: HCM Fellows in Germany
Rostock, Germany, 1994

P2. E. Stiliaris, E. Adamides, H.G. Bohlen, B. Gebauer, W. von Oertzen, W. Weller, M. Wilpert, Th. Wilpert:
Investigation of Refractive Scattering Contributions in Different Reaction Channels of the System $^{20}Ne+^{12}C$ at 20 MeV/u,
Spring meeting of the Deutsche Physikalische Gesellschaft
Groningen, Netherlands, 1987

P1. E. Stiliaris, H.G. Bohlen, X.S. Chen, B. Gebauer, A. Miczaika, W. von Oertzen, W. Weller and Th. Wilpert:
Mass Measurement and Spectroscopy of ^{57}Cu with the (^{14}C,^{15}N)-Reaction,
Spring meeting of the Deutsche Physikalische Gesellschaft
Heidelberg, Germany, 1986

Technical Reports

R12. E. Stiliaris:
The RTM Electron Injector at IASA and the SELPO-M Polarized Electron Source,
IASA Technical Note 99-03, IASA, 1999

R11. N.H. Papadakis, E. Stiliaris, C.N. Papanicolas:
Design Report: The Vacuum Test Chamber of the National Observatory of Athens,
IASA Internal Report, IASA 98-11, 1998

R10. E. Stiliaris:
Control System for the IASA RaceTrack Microtron,
IASA Internal Report, IASA 97-08, 1997

R9. E. Stiliaris, N. Patavalis, H. Rahmani:
Configuration and Installation of the XVME566 ADC Module,
IASA Technical Note 97-07, IASA, 1997

R8. E. Stiliaris, N. Patavalis, H. Rahmani:
Integration of the VMIVME-4105 Unit to the EPICS Toolkit,
IASA Technical Note 97-06, IASA, 1997

R7. E. Stiliaris, N. Patavalis, H. Rahmani:
Steerer Control with the VMIVME-4514 Unit Integrated to EPICS,
IASA Technical Note 97-05, IASA, 1997

R6. E.N. Gazis, M. Dris, T.A. Filippas and H. Rahmani, E. Stiliaris:
A Proposal for the ATLAS MUON Spectrometer (AMS) Detector Control System (DCS),
ATLAS Internal Note, DAQ-NO-056, MUO-NO-125, CERN, 1996

R5. T.A. Filippas, A.V. Filippa, E.N. Gazis, A. Karabarbounis, D. Maroulis, C.N. Papanicolas, N. Patavalis, H. Rahmani, E. Stiliaris, D. Bikos, G. Papavasileiou:
The IASA-RTM Control System,
IASA Internal Report, IASA 95-03, 1995

R4. E. Stiliaris:
Software Organization and Maintenance on Heterogeneous Systems,
ZEUS-Note 95-92, DESY-Hamburg, 1995

R3. E. Stiliaris:
BOOST: An Interactive Graphical Package for the Visualization of Lorentz Transformations,
ZEUS-Note 94-64, DESY-Hamburg, 1994

R2. E. Stiliaris:
A Data Reduction System for the HICCUP Offline Analysis Program,
Hahn-Meitner-Institute, Berlin, HMI-1986

R1. E. Stiliaris and H.G. Bohlen:
Raytrace Parametrization and Optics Corrections for the Q3D-Spectrometer,
Hahn-Meitner-Institute, Berlin, HMI-1984