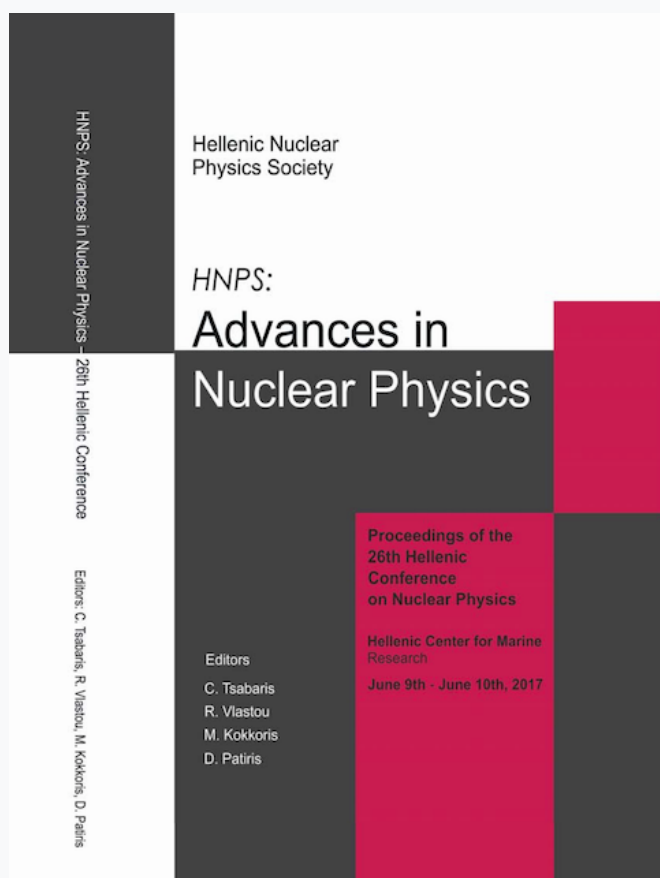


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HELLENIC NUCLEAR PHYSICS SOCIETY

PROCEEDINGS

26th HELLENIC CONFERENCE

ON

NUCLEAR PHYSICS



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9 & 10 JUNE 2017

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PREFACE

This volume contains the Proceedings of the 26th Hellenic Conference on Nuclear Physics, held in facilities of the Hellenic Centre for Marine Research of Anavyssos, Attica on the 9th and 10th of June 2017. The texts of the talks and posters are compiled as submitted by the authors.

This conference followed a series of Hellenic Nuclear Physics Conferences that started in 1990 at Thessaloniki and since then, they are yearly held at different Greek academic institutions involving Nuclear Physics. The aim of this series of conferences is to offer the local nuclear physics community the opportunity to present and discuss their latest activities in theoretical and experimental nuclear physics and applications, sometimes in collaboration with colleagues from abroad and with the use of local facilities along with facilities around the world. It is also a unique forum for presentations by young colleagues, in the early stages of their careers. For the first time of the conference series, a special session was dedicated to enterprises which develop, and commercialize state-of-the-art radiation equipment and products. Mirion Technologies, ITO Ltd and ANTISEL supported this special session with their participation and presentations.

The conference was organized under the auspices of the Hellenic Center for Marine Research (HCMR) and the National Technical University of Athens (NTUA). Grateful thanks are due to all the authorities of HCMR and particularly to the Institute of Oceanography for the financial support, the technical assistance and the facilities provided for the successful organization of the conference.

During the conference, Prof. Misaelides Panayiotis (Aristotle University of Thessaloniki) was honored by the board of HNPS for supporting the progress of Nuclear Science in Greece during his long academic career. Many of his colleagues praised his research achievements in the field of radiochemistry and radio-analytical chemistry as well as, his educational skills supervising and supporting the dissertations of many new scientists.

The assistance by several graduate and post graduate students is also warmly appreciated. Dr. Effrosini Androulakaki is gratefully acknowledged for the editorial assistance in the final preparation of the manuscripts and the excellent appearance of the present volume.

Anavyssos, Attica 2017

Christos Tsabaris
Rosa Vlastou
Michael Kokkoris
Dionisis Patiris

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26th Annual Symposium of HNPS - Symposium Program

Friday 9 June 2017

- 08:30 - 09:30 Registration
 09:30 - 10:00 Welcome Speeches

Session I: "Environmental Radiation", Chair: Harissopulos S.

- | | | | |
|---------------|--------------|-----------------------|---|
| 10:00 - 10:30 | Krittidis | NCSR Demokritos | The Greek lessons from the Chernobyl nuclear accident |
| 10:30 - 10:45 | Florou H. | NCSR Demokritos | Marine Radioactivity in the Eastern Mediterranean: Sources, pathways and the time evolution |
| 10:45 - 11:00 | Clouvas A. | AUTH | Response of the Greek early warning system Reuter-Stokes ionization chambers to terrestrial and cosmic radiation evaluated in comparison with spectroscopic data and time series analysis |
| 11:00 - 11:15 | Karydas A.G. | IAEA, NCSR Demokritos | Possibilities for basic and applied research in X-ray spectrometry using the IAEA multi-technique instrument operated at the XRF beamline of Elettra Sincrotrone Trieste |
| 11:15 - 11:30 | Patiris D.L. | HCMR | Submarine pockmarks area localization using in-situ radiotracing technique in Eckernförde bay, Germany |

11:30 - 12:00 Coffee Break

Session II: "Theoretical Nuclear Physics", Chair: Mavrommatis E.

- | | | | |
|---------------|-----------------|-----------------|--|
| 12:00 - 12:15 | Bonatsos D. | NCSR Demokritos | A New Symmetry for Heavy Nuclei: Proxy-SU(3) |
| 12:15 - 12:30 | Moustakidis Ch. | AUTH | Bounds on the speed of sound in dense matter, tidal polarizability and gravitational waves from neutron stars |
| 12:30 - 12:45 | Gaitanos T. | AUTH | Formation of fragments and hyperfragments in hadron-induced reactions |
| 12:45 - 13:00 | Martinou A. | NCSR Demokritos | Parameter-Independent Predictions for Nuclear Shapes, the Prolate Dominance and the Prolate-Oblate Shape Transition in the Proxy-SU(3) Model |
| 13:00 - 13:15 | Papoulias D. | UOI | Exploring Lepton-Flavour Violating Processes Through Neutrino Detection |

13:15 - 15:00 Lunch Break

Session III: "Experimental Methods for Environmental Processes and Protection", Chair: Misaelides P.

- | | | | |
|---------------|------------------|-----------------|---|
| 15:00 - 15:15 | Eleftheriadis K. | NCSR Demokritos | Lead and Uranium isotopes in Sahara Dust Aerosol observed in Athens by Alpha spectrometry |
| 15:15 - 15:30 | Karageorgis A. | HCMR | Surface sediment geochemistry of the North Aegean Sea: heavy metal hot spots |
| 15:30 - 15:45 | Kaberi H. | HCMR | Recent sedimentation rates in the Hellenic marine areas using ²¹⁰ Pb and ¹³⁷ Cs dating methods |
| 15:45 - 16:00 | Pagou K. | HCMR | The use of radioactive tracers to measure the variability of photosynthetic and bacterial productivity in Aegean marine water |
| 16:00 - 16:15 | Kalef-Ezra J. | UOI | Individual occupational radiation monitoring in Greece: where do we stand? |

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|---------------|-----------------|-----------------|--|
| 16:15 - 16:30 | Pappa F. | HCMR,NTUA | Chronological records of metal contamination in an abandoned mine (Lavrio, Greece) using sediment profiles |
| 16:30 - 16:45 | Mavrokefalou G. | NCSR Demokritos | Correlation of ¹³⁷ Cs activity concentrations with MODIS Ocean Colour Data in the Aegean Sea |

16:45 - 17:15 Short Break

Session IV: "Technological Advances in Radiation Detection", Chair: Tsabaris C.

| | | | |
|---------------|------------------------------|--------|--|
| 17:15 - 17:30 | Boulemar C. & Tischenbach E. | Mirion | Introduction to the Mirion Technologies group |
| 17:30 - 17:45 | Boulemar C. & Tischenbach E. | Mirion | Gamma detectors technologies overview & how to choose your HPGe detectors |
| 17:45 - 18:00 | Boulemar C. & Tischenbach E. | Mirion | ISOCS/LabSOCS technologies, cascade summing correction & In Situ measurements |
| 18:00 - 18:15 | Boulemar C. & Tischenbach E. | Mirion | Transition from NIM to modern MCA & applications (Spectroscopy, Compton suppression, Veto Cosmic, Low background spectroscopy) |

18:15 - 20:15 HNPS Annual General Assembly

21:00 Symposium Dinner

10:00 - 18:00 Poster session I

| | | | |
|-----|--------------------|----------------------|---|
| P1 | Betsou Ch. | AUTH | Natural and artificial radionuclides in moss samples from the region of Northern Greece |
| P2 | Kyratzis D. | AUTH | Study and Detection of Solar Neutrons at ground level with the Spherical Proportional Counter |
| P3 | Zisi G. | AUTH | Thermal and fast neutron flux studies in a subcritical neutron assembly regarding to neutron absorption cross section estimation |
| P4 | Savvidis G. | AUTH | Study of Stopping Power and Energy Deposition of Atmospheric Muons in the Spherical Proportional Counter (SPC): Simulation Using GEANT4 and Experimental Data |
| P5 | Konstantinidis P. | AUTH | Beta ray sensitivity of LiF dosimeters as a function of radiation temperature |
| P6 | Katsaras P. | AUTH | Mapping of the secondary neutron dose received in 15 MeV medical linac environments |
| P7 | Tzifas I. | AUTH | Actinides in coastal sands from Nisyros island and Northern Greece: A comparative investigation |
| P8 | Alexandropoulou S. | UOI | A study of tritium concentrations in air humidity following a rainfall |
| P9 | Alexandropoulou S. | UOI | Temporal and spatial variation of soil radon emanation |
| P10 | Sotiropoulou M. | NCSR Demokritos/AUTH | Radiological Parameters Applied in Non-human Biota Dose Assessment Tools Calculated Using ERICA Tool and Site-specific Data |
| P11 | Lykiardopoulou E.M | UOA | A comparative study of curve-fitting algorithms used for radiation detector efficiencies |
| P12 | Zagoraios G. | UOA | Building an Analog Polarity Alternator for Electromagnets used in Nuclear Structure Experiments |
| P13 | Andrikopoulos C. | UOA | Measurement and spectroscopic analysis of background radiation of UoA campus using NaI detector |
| P14 | Sideris I. | UOA | A systematic study of (t,p) reactions in mid-heavy nuclei using TALYS |
| P15 | Kanouta H. | UOI | Thin film profile measurements using RBS |

26th Annual Symposium of HNPS - Symposium Program

Saturday 10 June 2017

Session I: "Experimental Nuclear Physics I", Chair: Aslanoglou X.

| | | | |
|---------------|--------------------|-----------------|--|
| 10:00 - 10:15 | Nicolis N. | UOI | Spallation Reactions of 0.1 – 1.0 GeV protons on ²⁰⁸ Pb |
| 10:15 - 10:30 | Vagna E./Stoulos S | AUTH | Photodisintegration average cross sections of Dysprosium p-nuclei near (γ, n) reaction threshold |
| 10:30 - 10:45 | Georgali E. | UOI | Study of the ¹⁶² Er(n,2n) ¹⁶¹ Er reaction from the reaction threshold up to 19 MeV neutron beam energy |
| 10:45 - 11:00 | Eleme Z. | UOI | Neutron Beam Spatial Profile at n_TOF using CR-39 Nuclear Track Detectors |
| 11:00 - 11:15 | Savva M. | NCSR Demokritos | Novel Neutron Activation Detector for Fusion |

11:15 - 11:45 Coffee break

Session II: "Applications in Energy, Environment and Cultural Heritage", Chair: Stamatelatos I.

| | | | |
|---------------|-----------------------|-----------------|---|
| 11:45 - 12:00 | Pilakoura M. | PUAS | Radioactivity measurements in granite samples using NaI(Tl) spectrometry |
| 12:00 - 12:15 | Kantarelou V. | NCSR Demokritos | Developments in 2D and 3D XRF analysis from the Micro to Macro scale imaging of Cultural Heritage artefacts |
| 12:15 - 12:30 | Ntalla E. | NCSR Demokritos | Technique for Characterization and Clearance of the Resin Waste from the Greek Research Reactor (GRR-1) |
| 12:30 - 12:45 | Mylonakis A. | NCSR Demokritos | Developing a Monte-Carlo Solver for the Simulation of the Reactor Core Dynamics |
| 12:45 - 13:00 | Tsavalas P. | NCSR Demokritos | Investigation of the JET ITER-Like Wall Be Marker Tiles |
| 13:00 - 13:15 | Kalitzis P. 13:15 | AUTH | Radiological studies of zeolites application in the environment |
| - 13:30 | Servitzoglou N. 13:30 | AUTH | Natural radioactivity levels in wheat, farm soils and phosphate fertilizers |

- 14:30 Lunch break

Session III: "Experimental Nuclear Physics II", Chair: Styliaris S.

| | | | |
|---------------|------------------|-----------------|--|
| 14:30 - 14:45 | Mertzimekis T. | UOA | Isospin symmetry as a master mason for paving nuclear structure experiments along the proton drip line |
| 14:45 - 15:00 | Vasilopoulou T. | NCSR Demokritos | Calibration of activation foils detector assembly at the 14 MeV Frascati Neutron Generator |
| 15:00 - 15:15 | Papadimitriou S. | UOA | Microscopic description of neutron-induced fission with the Constrained Molecular Dynamics (CoMD) Model: recent progress |
| 15:15 - 15:30 | Asimakopoulou A. | UOA | Systematic studies of proton-induced spallation reactions with microscopic and phenomenological models |
| 15:30 - 15:45 | Zioga M. | UOA | A High Performance DAQ System for a Free Hand Small-Field γ -Camera |
| 15:45 - 16:00 | Rapsomanikis A. | UOA | PhoSim: A Software Simulation Package Designed for Macroscopic and Microscopic Studies in the Time-Resolved Optical Tomography |

16:00 - 16:30 Short Break

Session IV: "Experimental Nuclear Physics III", Chair: Souliotis G.A

| | | | |
|---------------|---------------------|-----------------------|---|
| 16:30 - 16:45 | Kokkoris M. | NTUA | CSIM – A new code for the simulation of channeling EBS/RBS spectra |
| 16:45 - 17:00 | Papageorgiou A. | UOA | Neutron-rich rare isotope production with stable and radioactive beams in the mass range $A \sim 40$ -60 at 15 MeV/nucleon |
| 17:00 - 17:15 | Stamatopoulos A. | NTUA | Measurement of the ^{234}U neutron-induced fission cross section using quasi-monoenergetic beams in the keV and MeV range and a Micromegas detector assembly |
| 17:15 - 17:30 | Kalamara A. | NTUA | Cross section measurements of the $^{197}\text{Au}(n,2n)^{196}\text{Au}$ reaction |
| 17:30 - 17:45 | Preketes-Sigalas K. | NTUA, NCSR Demokritos | PIGE related differential cross-section measurements of the $^{25}\text{Mg}(p,p'\gamma)^{25}\text{Mg}$ reaction |
| 17:45 - 18:00 | Ntemou E. | NTUA, NCSR Demokritos | Measurement of the differential cross sections of $^{6,7}\text{Li}(d,d_0)$ for Ion Beam Analysis purposes |

18:00 - 18:30 Closing

10:00 - 18:00 Poster Session II

| | | | |
|-----|------------------|----------------------|---|
| P1 | Maragos F. | HCMR/NTUA | Efficiency calibration of a medium resolution subsea detection system for sediment extended samples |
| P2 | Tsintari P. | NTUA | Differential cross-section measurements for deuteron elastic scattering on ^{nat}N for EBS purposes |
| P3 | Kolovi S. | NCSR Demokritos/UOA | Neutron Radiography using isotopic neutron sources: Preliminary results |
| P4 | Krokidi K. | NTUA | Experimental and theoretical study of the $(n,2n)$ reactions on $^{174,175}\text{Hf}$ isotopes |
| P5 | Chasapoglou S. | NTUA | Activation Cross Section Measurement of the $(n,2n)$ Reactions on Natural Ir Isotopes |
| P6 | Lagaki V. | UOA | Detailed efficiency simulations of the GEROS spectrometer using MCNP5 |
| P7 | Theodorou A. | UOA/NCSR Demokritos | Resistivity Recovery Stages of Proton Irradiated EUROFER97 Steel |
| P8 | Michalopoulou V. | NTUA | Measurement of the $^{234}\text{U}(n,f)$ and $^{236}\text{U}(n,f)$ cross-sections in the MeV region with MicroMegs detectors |
| P9 | Rouni P. | NTUA | Comparison of two sample preparation techniques for XRF analysis of fly ash samples |
| P10 | Triantou K. | NCSR Demokritos | Determining the positron lifetime of a material using Positron Annihilation Lifetime Spectroscopy |
| P11 | Togia N. | NCSR Demokritos, UOA | Photon activation analysis of metallurgical tap smelting slag using a high energy medical accelerator: Further studies |
| P12 | Karydas A.G. | NCSR Demokritos | Potentialities and perspectives of proton induced quasi-monochromatic X-rays in fundamental studies and analytical applications |
| P13 | Manousakas M. | NCSR Demokritos | Nuclear analytical techniques for the chemical characterization of aerosol samples |
| P14 | Karachristou I. | NCSR Demokritos | Release of the Radiochemical Lab at the Tandem Accelerator Building |
| P15 | Eleftheriou G. | NOA | Radon Monitoring as Part of Multidisciplinary Study of Pre-Earthquake Anomalies in the Western Hellenic Trench |