

## Annual Symposium of the Hellenic Nuclear Physics Society

Τόμ. 6 (1995)

HNPS1995



### Editorial Comments and Symposium Info

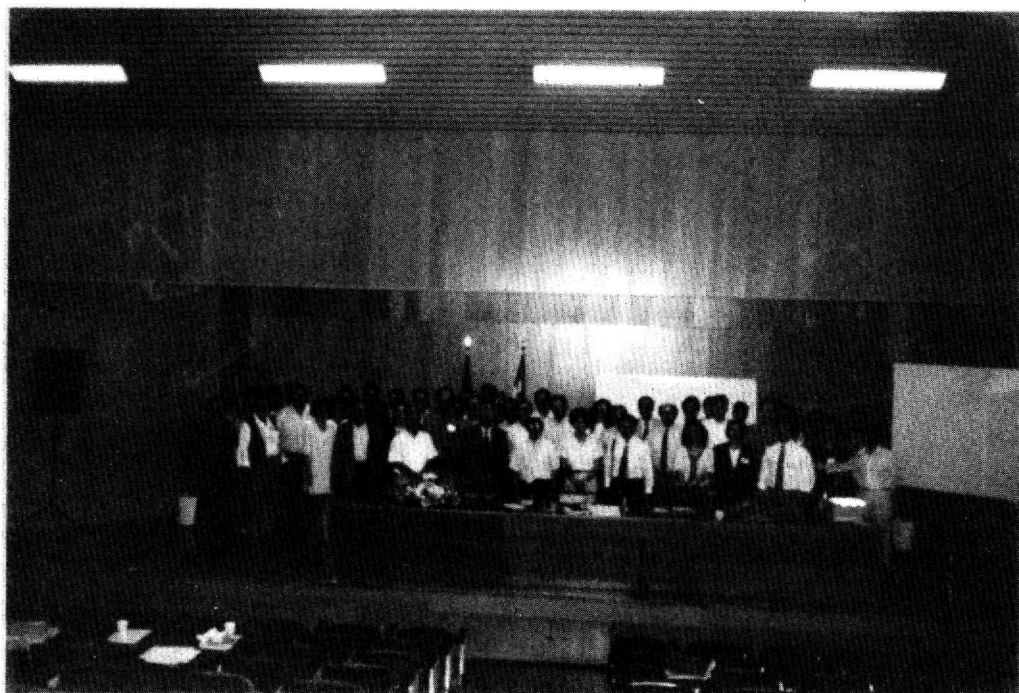
/ Editorial Comments

doi: [10.12681/hnps.2910](https://doi.org/10.12681/hnps.2910)

### Βιβλιογραφική αναφορά:

Editorial Comments, /. (2020). Editorial Comments and Symposium Info. *Annual Symposium of the Hellenic Nuclear Physics Society*, 6, iii-xxiii. <https://doi.org/10.12681/hnps.2910>

## Advances in Nuclear Physics



### **Sponsors**

Technological Education Institute of Piraeus  
250 Thivon and Petrou Ralli  
12244 Athens, Greece

Hellenic Nuclear Physics Society

# **Advances in nuclear physics**

Proceedings of the  
**6th Hellenic Symposium on Nuclear Physics**

Hellenic Nuclear Physics Society

Technological Education Institute of Piræus  
26 and 27 May 1995

Editor  
Constantine N. Panos

ION PUBLISHING GROUP  
- **MAKEDONIAN PUBLICATIONS** -  
7 Sybligadon, 12131 Athens, Greece  
Phone: ++30 1 5747729, 5742686, 5771908, 5768853  
Fax: ++30 1 5751438

## HELLENIC NUCLEAR PHYSICS SOCIETY

### Governing Board

ANAGNOSTATOS, G. S. (NCSR "Demokritos")

HARISSOPULOS, S. V. (NCSR "Demokritos")

KOSMAS, T. S. (U. of Ioannina)

MASSEN, S. (U. of Thessaloniki)

SYROS, C. (U. of Patras)

©1996 MAKEDONIAN PUBLICATIONS

Reproduction is authorized, except for commercial purposes, provided the source is acknowledged.

ISBN 960-319-085-3

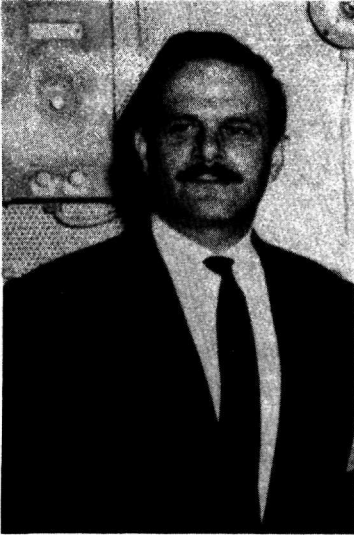
#### ORGANIZING COMMITTEE

HINOPOULOS, Vassilios (TEI of Piraeus)  
KOUTROUBAS, Stylianos (TEI of Piraeus)  
PANOS, Constantine (TEI of Piraeus), Chairman  
PILAKOUTA, Myrofora (TEI of Piraeus)  
POUPAKI, Irene (Greek Atomic Energy Agency)



## DEDICATION

These proceedings are dedicated to the memory of Themistocles Kanellopoulos and Stamatina Dritsa for their contributions to our field and society following the decision of the General Assembly of the Hellenic Nuclear Physics Society held on May 26, 1995.



Th. Kanellopoulos

One of the founders of modern physics in Greece. His pioneering work with K. Wildermuth on the cluster model in nuclear physics, which they introduced in 1958, has had a major impact on the field since then. First Scientific Director of the Nuclear Research Center "Demokritos" for many years. Inspired teacher, in advanced courses in the first graduate program of NRC "Demokritos" in the early sixties, of many present Greek researchers and university professors, who always remember him with gratitude.



S. Dritsa

One of the first members of the scientific community of "Demokritos" (since 1965) specialized in nuclear spectroscopy, being also in close contact with the reactor team. Founder of the Society of Scientists at "Demokritos", served as its President for many years. Founding member of the Hellenic Nuclear Physics Society. Liaison of the E.D.E.S. resistance organization in the struggle against the occupying forces in Greece during World War II, officially recognized through the award of a medal by the Greek State.





## PREFACE

This book includes the papers presented at the 6th Hellenic Symposium on Nuclear Physics, held in the Technological Education Institute (TEI) of Piraeus on May 26 and 27, 1995. The previous symposia have been organized by the U. of Thessaloniki (1990), NCSR "Demokritos" and U. of Athens (1991), National Technical U. of Athens (1992), U. of Ioannina (1993), and U. of Patras (1994). The next symposium is scheduled to be held in the TEI of Athens in May 1996.

The papers included are arranged according to the order in which they were presented following the programme of the Symposium (given on page 371), the first session being the one for the three invited papers. In addition, poster contributions are presented in the second part of this volume.

## Acknowledgements

The Organizing Committee wishes to thank the President of the Technological Education Institute (TEI) of Piraeus Prof. P. Kikilias and the Vice-President Prof. G. Serelea and all members of the Governing Board for the generous financial support and for the use of the facilities of the Institute. The Organizing Committee also thanks the Hellenic Nuclear Physics Society for the financial support of the participating postdoctoral researchers from abroad, as well as Dr. S. Papadopoulos for essential assistance in the organization of the Symposium.

The publication of the present volume has been accomplished through the further financial support of the President and the Governing Board of the TEI of Piraeus, as well as of the Hellenic Nuclear Physics Society. Editorial assistance in the final preparation of the manuscripts was offered by Drs P. Divari, N. Fotiades, M. Kokkoris, N. Vodinas, and for the organization of the material in this volume by D. Bonatsos. Their valuable contribution to the excellent appearance of the present volume is greatly appreciated.

The Editor

Constantine N. Panos

Athens, May 1996

Department of Physics-Chemistry and Technology of Materials,

TEI of Piraeus,

250 Thivon and Petrou Ralli, 12244 Athens, Greece.

Tel: ++30 1 5450951 ext. 163. Fax: ++30 1 5450962.



## CONTENTS

| <b>Part I Papers Presented Orally</b>  | <b>(in symposium order)</b> |
|--|-----------------------------|
| <b>Binding energies of hypernuclei and hypernuclear interactions</b><br>A. R. Bodmer, S. Murall, and Q. N. Usmanis .....   | 1                           |
| <b>Cold Dark Matter in SUSY Theories. The Role of Nuclear Form Factors and the Folding with the LSP Velocity.</b><br>T. S. Kosmas, J. D. Vergados .....                                | 23                          |
| <b>Energy Amplifier</b><br><b>A More Clear and Promising Nuclear Energy</b><br>S. Charalambous .....   | 50                          |
| <b>Energy Structure and Distribution of Macroscopical Fermion Matter</b><br>C. Syros .....   | 51                          |
| <b>Study of the Half-Diagonal Two-Body Density Matrix of Model Nuclear Matter</b><br>M. Petraki, E. Mavrommatis, and J. W. Clark .....   | 58                          |
| <b>Effects of Short Range Correlations on the Ca and O isotopes</b><br>S. E. Massen .....  | 72                          |
| <b>The nucleon momentum distribution in the <math>{}^4\text{He}</math> nucleus using the Morse potential</b><br>K. Ypsilantis, S. Dimitrova, C. Koutroulos, M. Grypeos, A. Antonov ... | 87                          |
| <b>Neutrino - Nucleus Reaction Cross Sections at Low and Intermediate Energies</b><br>T. S. Kosmas, E. Oset .....  | 100                         |
| <b>Lifetime measurements in <math>{}^{110}\text{Cd}</math></b><br>S. Harissopulos, A. Dewald, A. Gelberg, P. von Brentano, K. O. Zell, and C. A. Kalfas .....                          | 111                         |

**High spin levels in  $^{119}\text{Te}$** 

- C. T. Papadopoulos, R. Vlastou, M. Serris, H. G. Hartas, N. Fotiades, C. A. Kalfas, S. Harissopulos, S. Kossionides, J. Simpson, E. S. Paul, C. W. Beausang, M. J. Joyce, J. F. Sharpey-Shafer, S. Araddad, and M. A. Bentley ..... 125

**Nuclear shape coexistence in  $^{193}\text{Hg}$** 

- N. Fotiades, S. Harissopulos, C. A. Kalfas, S. Kossionides, C. T. Papadopoulos, R. Vlastou, M. Serris, M. Meyer, N. Redon, R. Duffait, Y. Le Coz, L. Ducroux, F. Hannachi, I. Deloncle, B. Gall, M. G. Porquet, C. Schuck, F. Azaiez, J. Duprat, A. Korichi, J. F. Sharpey-Shafer, M. J. Joyce, C. W. Beausang, P. J. Dagnall, P. D. Forsyth, S. J. Gale, P. M. Jones, E. S. Paul, J. Simpson, R. M. Clark, K. Hauschild, and R. Wadsworth ..... 131

**High Spin Structure of  $^{122}\text{Xe}$** 

- M. Serris, R. Vlastou, C. T. Papadopoulos, C. A. Kalfas, N. Fotiades, S. Harissopulos, S. Kossionides, M. A. Riley, J. Simson, E. Paul, J. F. Sharpey-Shafer, and P.J. Twin ..... 140

**Calibration and Monte-Carlo Simulation of the Detection System PTOLEMEOS**

- K. Spyrou, C. Chronidou, S. Harissopulos, E. Kossionides, and T. Paradellis ..... 152

 **$^{19}\text{F}(\text{p},\alpha\gamma)^{16}\text{O}$  : Test Reaction for the Detection System PTOLEMEOS**

- C. Chronidou, K. Spyrou, S. Harissopulos, E. Kossionides, and T. Paradellis ..... 165

**Double-, energy-, angle- differential and total yield cross section data of  $^{58}\text{Ni}(\text{n},\alpha)^{55}\text{Fe}$  reaction**

- C. Tsabaris, R. Vlastou, C. T. Papadopoulos, C. A. Kalfas, E. Wattecamps, and G. Rollin ..... 176

**The IASA Racetrack Microtron Facility (Athens, Greece)**

- H. Avramopoulos, D. Economou, T. A. Fillipas, E. N. Gazis, K. Hizanidis, A. Karabarbounis, D. Maroulis, C. N. Papanicolas, H. Rahmani, C. Trikalinos, and N. Uzunoglou ..... 187

**Off-shell Nucleons in Intermediate Energy Physics**

- Grigorios I. Poulis ..... 188

|   |     |
|---|-----|
| <b>Quasi-Exactly Soluble Potentials and Deformed Oscillators</b>  |     |
| Dennis Bonatsos, C. Daskaloyannis, and Harry A. Mavromatis .....  | 199 |
| <b>The oscillator spacing of nuclei as function of N and Z</b>  |     |
| G. A. Lalazissis, C. P. Panos .....   | 212 |
| <b>Shell model calculations in the <math>A \sim 100</math> mass region.</b>   |     |
| P. Divari, L. D. Skouras .....  | 225 |
| <b>The Energy Dependence of the Proton-Alpha Reaction to Continuum States</b>   |     |
| P. Demetriou .....  | 253 |
| <b>Determination of light elements using the RBS method</b>   |     |
| M. Kokkoris, Ch. Zarkadas, S. Harissopoulos, E. Kossionides, and Th. Paradellis .....   | 263 |
| <b>Radiation damage of thin films of <math>\text{YBa}_2\text{Cu}_3\text{O}_7</math> superconductors</b>                                 |     |
| R. Vlastou, E. N. Gazis, C. T. Papadopoulos, E. Liarokapis, D. Palles, S. Kossionides, M. Pilakouta, W. Assmann, and H. Huber .....     | 271 |
| <b>Heavy Ion RBS Characterization of Multilayer Coatings Deposited on Glass Through the Sol-Gel Technique.</b>                          |     |
| X. Aslanoglou, P.A. Assimakopoulos, C. Trapalis, G. Kordas, M.A. Karakasides, and M. Pilakouta .....                                    | 279 |
| <b>Assessment of arrangements for the detection of radon emanating from soil</b>  |     |
| C. A. Papachristodoulou, K. G. Ioannides, T.J. Mertzimekis, D. T. Karamanis, and K. C. Stamoulis .....                                  | 288 |
| <b>Studies of <math>^{137}\text{Cs}</math> absorption-desorption processes in sediments, using <math>\gamma</math>-ray spectroscopy</b> |     |
| T. J. Mertzimekis, K. G. Ioannides, C. A. Papachristodoulou, K. C. Stamoulis, and D. T. Karamanis .....                                 | 302 |
| <b>A Research Study on the Radiological State of Building Material and the Risk Assessment</b>  |     |
| A. Savidou, C. Raptis, and P. Kritidis .....  | 313 |
| <b>Environmental study of natural radioactivity regime of the Ikaria island and the radiological impact</b>                             |     |
| G. Trabidou, H. Florou, A. Angelopoulos, L. Sakelliou, I. Katsikis .....  | 321 |

---

## Part II Posters

---

### Polarized electrons at NIKHEF

N. H. Papadakis, N. P. Vodinas, C. W. de Jager, F. Kroes, H. B. Rookhuizen, T. Shuyk, S. G. Popov, Yu M. Shatunov, I. A. Koop, B. L. Militsyn, I. Nesterenko, V. Osipov, A. Mamutkin, S. G. Konstantinov, P. Klimin, B. Lazarenko, E. S. Konstantinov, A. Lysenko, V. Kozak, G. V. Serdobintsev, A. Nikiforov, V. Ya. Korchagin, A. S. Terekhov, S. V. Shevelev, and A. M. Gilinsky ..... 331

### The Compton electron beam polarimeter for the *AmPS* ring

N.P. Vodinas, C. W. de Jager, N. H. Papadakis, and I. Passchier ..... 338

### Study of the Exotic Nuclei Near $Z = 40$ IN RMF Theory

G. A. Lalazissis, M. M. Sharma ..... 350

### Energy Amplifier

#### A More Clear and Promising Nuclear Energy (*in Greek*)

S. Charalambous ..... 352

Symposium Programme ..... 371

## LIST OF PARTICIPANTS

1. **Anagnostatos G.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
2. **Alexandropoulos A.**  
Department of Mathematics, Technological Education Institute of Piraeus, Thivon 250, GR-122.44 Athens, Greece.
3. **Antoniou Al.**  
Department of Mechanical Engineering, Technological Education Institute of Piraeus, Thivon 250, GR-122.44 Athens, Greece.
4. **Aravantinos A.**  
Department of Physics, Technological Education Institute of Athens, Aghiou Spyridonos str. 122, GR-122.10 Aegaleo, Greece.
5. **Aslanoglou X.**  
Department of Physics, Division of Nuclear Physics, University of Ioannina, GR-451.10 Ioannina, Greece.
6. **Batarias N.**  
Department of Physics, Technological Education Institute of Athens, Aghiou Spyridonos str. 122, GR-122.10 Aegaleo, Greece.
7. **Bodmer A.**  
Physics Division Argonne National Laboratory, Argonne, IL 60439-4843, USA.
8. **Bonatsos D.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-15310 Aghia Paraskevi, Athens, Greece.
9. **Chalkia L.**  
Papagou Ave. 122, GR-157.72 Zografou, Athens, Greece.
10. **Charalambous S.**  
Aristotle University of Thessaloniki, Department of Physics, Division of Nuclear Physics, GR-540.06 Thessaloniki, Greece.
11. **Chronidou C.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
12. **Daskaloyannis K.**  
Aristotle University of Thessaloniki, Department of Physics, Division of Theoretical Physics, GR-540.06 Thessaloniki, Greece.



13. **Demetriou P.**  
Division of Nuclear and Particle Physics, Department of Physics, University of Oxford, Keble Road, OX1 3RH, Oxford, England.
14. **Divari P.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
15. **England J. B.**  
11 Selly Wick Rd., Selly Park, Birmingham B29 7JJ, England.
16. **Fotiades N.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
17. **Florou E.**  
Institute of Nuclear Technology and Radiation Protection, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
18. **Galios G.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
19. **Garofalakis G.**  
Department of Physics and Chemistry, Technological Education Institute of Piraeus, Thivon 250, GR-122.44 Athens, Greece.
20. **Gazis E.**  
Department of Physics, National Technical University of Athens, Zographou Campus, GR-157.80 Zographou, Athens, Greece.
21. **Grypeos M.**  
Aristotle University of Thessaloniki, Department of Physics, Division of Theoretical Physics, GR-540.06 Thessaloniki, Greece.
22. **Harissopoulos S.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
23. **Hinopoulos V.**  
Department of Physics and Chemistry, Technological Education Institute of Piraeus, Thivon 250, GR-122.44 Athens, Greece.
24. **Ioannou P.**  
University of Athens, Department of Physics, Division of Nuclear and Particle Physics, Panepistimioupolis, Kouponia, GR-157.71 Athens, Greece.
25. **Kalfas C.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.

26. **Kakanis P.**  
Hellenic Atomic Energy Agency, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
27. **Karabarbounis A.**  
University of Athens, Department of Physics, Division of Nuclear and Particle Physics, Panepistimioupolis, Kouponia, GR-157.71 Athens, Greece.
28. **Katselis V.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
29. **Kikilias P.**  
Department of Mathematics, Technological Education Institute of Piraeus, Thivon 250, GR-122.44 Athens, Greece.
30. **Kokkoris M.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
31. **Kontesis M.**  
Department of Mathematics, Technological Education Institute of Piraeus, Thivon 250, GR-122.44 Athens, Greece.
32. **Kosmas T.**  
Department of Physics, Division of Theoretical Physics, University of Ioannina, GR-451.10 Ioannina, Greece.
33. **Kossionides S.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
34. **Kotsos V.**  
Aristotle University of Thessaloniki, Department of Physics, Division of Theoretical Physics, GR-540.06 Thessaloniki, Greece.
35. **Koutroulos C.**  
Aristotle University of Thessaloniki, Department of Physics, Division of Theoretical Physics, GR-540.06 Thessaloniki, Greece.
36. **Koutroumbas S.**  
Department of Physics and Chemistry, Technological Education Institute of Piraeus, Thivon 250, GR-122.44 Athens, Greece.
37. **Lenis D.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.

38. **Liolios Th.**  
Aristotle University of Thessaloniki, Department of Physics, Division of Theoretical Physics, GR-540.06 Thessaloniki, Greece.
39. **Massen S.**  
Aristotle University of Thessaloniki, Department of Physics, Division of Theoretical Physics, GR-540.06 Thessaloniki, Greece.
40. **Mavrommati-Fountou E.**  
University of Athens, Department of Physics, Division of Nuclear and Particle Physics, Panepistimioupolis, Kouponia, GR-157.71 Athens, Greece.
41. **Mertzimekis Th.**  
Department of Physics, Division of Nuclear Physics, University of Ioannina, GR-451.10 Ioannina, Greece.
42. **Michelakakis E.**  
Department of Physics and Chemistry, Technological Education Institute of Piraeus, Thivon 250, GR-122.44 Athens, Greece.
43. **Nikolaidis G.**  
Department of Physics and Chemistry, Technological Education Institute of Piraeus, Thivon 250, GR-122.44 Athens, Greece.
44. **Panos C. N.**  
Department of Physics and Chemistry, Technological Education Institute of Piraeus, Thivon 250, GR-122.44 Athens, Greece.
45. **Panos C. P.**  
Aristotle University of Thessaloniki, Department of Physics, Division of Theoretical Physics, GR-540.06 Thessaloniki, Greece.
46. **Papadopoulos C.**  
Department of Physics, National Technical University of Athens, Zographou Campus, GR-157.80 Zographou, Athens, Greece.
47. **Papadopoulos G.**  
Aristotle University of Thessaloniki, Department of Physics, Division of Theoretical Physics, GR-540.06 Thessaloniki, Greece.
48. **Papadopoulos S.**  
Department of Physics and Chemistry, Technological Education Institute of Piraeus, Thivon 250, GR-122.44 Athens, Greece.
49. **Papakitsos A.**  
Department of Physics and Chemistry, Technological Education Institute of Piraeus, Thivon 250, GR-122.44 Athens, Greece.

50. **Papanicolas C.**  
University of Athens, Department of Physics, Division of Nuclear and Particle Physics, Panepistimioupolis. Kouponia. GR-157.71 Athens, Greece.
51. **Papachristodoulou C.**  
Department of Physics, Division of Nuclear Physics, University of Ioannina, GR-451.10 Ioannina, Greece.
52. **Pappas P.**  
Department of Physics and Chemistry, Technological Education Institute of Piraeus, Thivon 250, GR-122.44 Athens, Greece.
53. **Parikos G.**  
7, Sybligadon str., GR-121.31, Peristeri, Greece.
54. **Petraki M.**  
University of Athens, Department of Physics, Division of Nuclear and Particle Physics, Panepistimioupolis, Kouponia, GR-157.71 Athens, Greece.
55. **Pilakouta M.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
56. **Potiriadis K.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
57. **Poulis T.**  
NIKHEF-K, Theory Group, P.O.Box 41882, 1009-DB-Amsterdam, The Netherlands.
58. **Poupaki I.**  
Formionos str. 21, GR-161.21 Athens, Greece.
59. **Prelorentzos L.**  
Department of Physics, Technological Education Institute of Athens, Aghiou Spyridonos str. 122, GR-122.10 Aegaleo, Greece.
60. **Savidis E.**  
Aristotle University of Thessaloniki, Department of Physics, Division of Nuclear Physics, GR-540.06 Thessaloniki, Greece.
61. **Savidou A.**  
Institute of Nuclear Technology and Radiation Protection, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
62. **Serelea G.**  
Department of Management, Technological Education Institute of Piraeus, Thivon 250, GR-122.44 Athens, Greece.

63. **Serris M.**  
Department of Physics, National Technical University of Athens, Zographou Campus, GR-157.80 Zographou, Athens, Greece.
64. **Sianoudis I.**  
Department of Physics, Technological Education Institute of Athens, Aghiou Spyridonos str. 122, GR-122.10 Aegaleo, Greece.
65. **Sklavenitis D.**  
Department of Physics and Chemistry, Technological Education Institute of Piraeus, Thivon 250, GR-122.44 Athens, Greece.
66. **Skountzos P.**  
Department of Physics and Chemistry, Technological Education Institute of Piraeus, Thivon 250, GR-122.44 Athens, Greece.
67. **Skouras L.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
68. **Spyrou K.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
69. **Syros C.**  
University of Patras, Laboratory of Nuclear Technology, GR-261.10 Patras, Greece.
70. **Trabidou G.**  
Institute of Nuclear Technology and Radiation Protection, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
71. **Trouposkiadis L.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi, Athens, Greece.
72. **Tsagakis E.**  
Department of Electronics, Technological Education Institute of Piraeus, Thivon 250, GR-122.44 Athens, Greece.
73. **Tsambaris C.**  
Department of Physics, National Technical University of Athens, Zographou Campus, GR-157.80 Zographou, Athens, Greece.
74. **Valamontes S.**  
NCSR "Demokritos", Laboratory for Plasma Physics, GR-153.10 Aghia Paraskevi, Athens, Greece.

75. **Varvitsiotis I.**  
Aetion 24, GR-113.64 Athens, Greece.
76. **Vergados I.**  
Department of Physics, Division of Theoretical Physics, University of Ioannina,  
GR-451.10 Ioannina, Greece.
77. **Vlastou R.**  
Department of Physics, National Technical University of Athens, Zographou  
Campus, GR-157.80 Zographou, Athens, Greece.
78. **Vlahos G.**  
Department of Mechanical Engineering, Technological Education Institute of  
Piraeus, Thivon 250, GR-122.44 Athens, Greece.
79. **Xenoulis A.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi,  
Athens, Greece.
80. **Zamani-Zamaki M.**  
Aristotle University of Thessaloniki, Department of Physics, Division of Nuclear  
Physics, GR-540.06 Thessaloniki, Greece.
81. **Zarkadas C.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi,  
Athens, Greece.
82. **Zikos D.**  
Institute of Nuclear Physics, NCSR Demokritos, GR-153.10 Aghia Paraskevi,  
Athens, Greece.