

Catalin Matei, PhD

Extreme Light Infrastructure – Nuclear Physics

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EDUCATION

- **Ohio University**, Athens, OH, USA 2001-2006
Doctor of Philosophy in Nuclear Physics, November 2006
- **University of Bucharest**, Bucharest, Romania 1995-2000
Dipl. Eng. in Applied Nuclear Physics, June 2000

PROFESIONAL EXPERIENCE

- **Extreme Light Infrastructure – Nuclear Physics**, Magurele, Romania 2014-present
Senior Scientist, Gamma Driven Experiments Department
 - Design and development of instruments for the Gamma Beam Delivery and Diagnostics project.
 - Leading the development of the ELISSA silicon array and the experimental program in charged particle detection.
- **National Physical Laboratory**, Teddington, United Kingdom 2012-2014
Higher Research Scientist, Neutron Metrology Group
 - Project manager for the thermal neutron facility. Coordinating irradiations for calibration and testing of reactor instruments and radiation measuring devices. Developing technical procedures, quality assurance implementation, contract preparation and negotiation.
- **European Commission - Joint Research Centre**, Geel, Belgium 2009-2012
Postdoctoral Fellow, Neutron Physics Unit
 - Developed experimental setup and analysis for measurements of prompt neutron emission multiplicity in the fission of ^{252}Cf . Tested and characterized novel neutron detectors. Implemented MCNPX simulation for optimizing neutron detector array design.
- **Oak Ridge National Laboratory**, Oak Ridge, TN, USA 2006-2009
Postdoctoral Fellow, Nuclear Astrophysics Group
 - Leading role in developing the “Versatile Array for Neutron Detection at Low Energies” project. Managed the purchasing, testing and design of various components of the array. Developed test plans and coordinated neutron measurement campaigns at various research facilities.
 - Experimental program in charged particle detection with silicon strip detectors.
- **Ohio University**, Athens, Ohio, USA 2001-2006
Graduate Research Assistant, Department of Physics and Astronomy
 - Developed and analyzed accelerator-based nuclear physics experiments at facilities in US and Canada. Tested and characterized NaI, BGO, and HPGe detectors. Certified Tandem Van de Graaff operator.

PUBLICATIONS (SELECTED)

1. Investigation of Compton Scattering for Gamma Beam Intensity Measurements and Perspectives at ELI-NP, G.V. Turturica, **C. Matei**, A. Pappalardo, D.L. Balabanski, S. Chesnevskaia, V. Iancu, C.A. Ur, H.J. Karwowski, K.A. Chipps, M.T. Febraro, S.D. Pain, D. Walter, C.Aa. Diget, J. Frost-Schenk, M. Munch, G.L. Guardo, M. La Cognata, R.G. Pizzone, G.G. Rapisarda, K.Y. Chae, M.J. Kim, M.S. Kwag, **Nucl. Instr. Meth. A921, 27 (2019)**
2. Photodisintegration reaction rate involving charged particles: systematic uncertainty from nuclear optical model potential and experimental solution based on ELI-NP, H.Y. Lan, Y. Xu, W. Luo, D.L. Balabanski, S. Goriely, **C. Matei**, A. Anzalone, S. Chesnevskaia, G.L. Guardo, M. La Cognata, D. Lattuada, R.G. Pizzone, S. Romano, C. Spitaleri, A. Taffara, A. Tumino, and Z.C. Zhu, **Phys. Rev. C. 98, 054601 (2018)**
3. Extreme Light Infrastructure - Nuclear Physics pillar (ELI-NP): new horizons in physics with high power lasers and brilliant gamma beams, S. Gales, K.A. Tanaka, D.L. Balabanski, F. Negoita, D. Stutman, O. Tesileanu, C.A. Ur, D. Ursescu, S. Ataman, M.O. Cernaianu, I. Dancus, B. Diaconescu, N. Djourelou, D. Filipescu, P. Ghenuche, **C. Matei**, K. Seto, L. D'Alessi, M. Zeng, N. V. Zamfir **Reports of Progress in Physics 81 (9) 094301 (2018)**
4. Performance Studies of X3 Silicon Detectors for the Future ELISSA Array at ELI-NP, S. Chesnevskaia, D.L. Balabanski, D. Choudhury, P. Constantin, D.M. Filipescu, D.G. Ghita, G.L. Guardo, D. Lattuada, **C. Matei**, A. Rotaru, A. State, **J. Instr. 13, T05006 (2018)**
5. First spin-parity constraint of the 306 keV resonance in ^{35}Cl for nova nucleosynthesis, K.A. Chipps, S.D. Pain, R.L. Kozub, D.W. Bardayan, J.A. Cizewski, K.Y. Chae, J.F. Liang, **C. Matei**, W.A. Peters, S.T. Pittman, K.T. Schmitt, and M.S. Smith, **Phys. Rev. C 95, 045808 (2017)**
6. Absolute cross section measurements of neutron-induced fission of ^{242}Pu from 1 to 2.5 MeV, **C. Matei**, F. Belloni, J. Heyse, A.J.M. Plompen, D.J. Thomas, **Phys. Rev. C 95, 024606 (2017)**
7. "Performance of the Versatile Array of Neutron Detectors at Low Energy (VANDLE)", W.A. Peters, S. Ilyushkin, M. Madurga, **C. Matei**, S.V. Paulauskas, R.K. Grzywacz, D.W. Bardayan, C.R. Brune, J. Blackmon, J.A. Cizewski, R.L. Kozub, B. Manning, T.N. Massey, M. Matos, E. Merino, P.D. O'Malley, F. Raiola, F. Sarazin, D. Walter, **Nucl. Instr. Meth. A836, 122 (2016)**
8. "Investigation of the $d(g,n)p$ reaction for gamma beam monitoring at ELI-NP", **C. Matei**, J.M. Mueller, M.H. Sikora, G. Suliman, C.A. Ur, H.R. Weller, **J. Instr. 11, P05025 (2016)**
9. "Gamma beam delivery and diagnostics at ELI-NP", H.R. Weller, C.A. Ur, **C. Matei**, J.M. Mueller, M.H. Sikora, G. Suliman, V. Iancu, Z. Yasin, **Rom. Rep. Phys. 68, S447 (2016)**
10. "Nuclear resonance fluorescence experiments at ELI-NP", C.A. Ur, A. Zilges, N. Pietralla, J. Beller, B. Boisdeffre, M.O. Cernaianu, V. Derya, B. Loeher, **C. Matei**, G. Pascovici, C. Petcu, C. Romig, D. Savran, G. Suliman, E. Udup, V. Werner, **Rom. Rep. Phys. 68, S483 (2016)**
11. "Gamma above the neutron threshold experiments at ELI-NP", F. Camera, H. Utsuomiya, V. Varlamov, D. Filipescu, V. Baran, A. Bracco, G. Colo, I. Gheorghe, T. Glodariu, **C. Matei**, O. Wieland, **Rom. Rep. Phys. 68, S539 (2016)**
12. "Charged particle detection at ELI-NP", O. Tesileanu, M. Gai, A. Anzalone, C. Balan, J.S. Bihalowicz, M. Cwiok, W. Dominik, S. Gales, D.G. Ghita, Z. Janas, D.P. Kendellen, M. La Cognata, **C. Matei**, K. Mikszuta, C. Petcu, M. Pfutzner, T. Matulewicz, C. Mazzocchi, C. Spitalieri, **Rom. Rep. Phys. 68, S699 (2016)**

13. "Constraint of the astrophysical $^{26}\text{Al}(p,g)^{27}\text{Si}$ destruction rate at stellar temperatures", S.D. Pain, D.W. Bardayan, J.C. Blackmon, S.M. Brown, K.Y. Chae, K.A. Chipps, J.A. Cizewski, K.L. Jones, R.L. Kozub, J. F. Liang, **C. Matei**, M. Matos, B.H. Moazen, C.D. Nesaraja, P.D. O'Malley, W.A. Peters, S.T. Pittman, K.T. Schmitt, J.F. Shriner, D. Shapira, M.S. Smith, **Phys. Rev. Lett.** **114**, 212501 (2015)
14. "Reactions of a ^{10}Be beam on proton and deuteron targets", K.T. Schmitt, K.L. Jones, A. Bey, S.H. Ahn, D.W. Bardayan, J.C. Blackmon, K.Y. Chae, K.A. Chipps, J.A. Cizewski, K.I. Hahn, J.J. Kolata, R.L. Kozub, J.F. Liang, **C. Matei**, B.H. Moazen, C. Nesaraja, F.M. Nunes, P.D. O'Malley, S.D. Pain, W.A. Peters, S.T. Pittman, M.S. Smith, I. Spassova, D.W. Stracener, **Phys. Rev. C** **88**, 064612 (2013)
15. "Proton light output function and neutron efficiency of a p-terphenyl detector using a ^{252}Cf source", **C. Matei**, F.-J. Hamsch, and S. Oberstedt, **Nucl. Instr. Meth. A** **676**, 135 (2012)
16. "Neutron single particle structure in ^{131}Sn and direct neutron capture cross sections", R.L. Kozub, G. Arbanas, A.S. Adekola, D.W. Bardayan, J.C. Blackmon, K.Y. Chae, K.A. Chipps, J.A. Cizewski, L. Erikson, R. Hatarik, W.R. Hix, K.L. Jones, W. Krolas, J.F. Liang, Z. Ma, **C. Matei**, B.H. Moazen, C.D. Nesaraja, S.D. Pain, D. Shapira, J.F. Shriner, M.S. Smith, T.P. Swan, **Phys. Rev. Lett.** **109**, 172501 (2012)
17. "Halo nucleus ^{11}Be : A spectroscopic study via neutron transfer", K.T. Schmitt, K.L. Jones, A. Bey, S.H. Ahn, D.W. Bardayan, J.C. Blackmon, K.Y. Chae, K.A. Chipps, J.A. Cizewski, K.I. Hahn, J.J. Kolata, R.L. Kozub, **C. Matei**, B.H. Moazen, C. Nesaraja, F.M. Nunes, P.D. O'Malley, S.D. Pain, W.A. Peters, S.T. Pittman, D. Shapira, J.F. Shriner, M.S. Smith, **Phys. Rev. Lett.** **108**, 192701 (2012)
18. "Direct studies of low-energy resonances in $^{31}\text{P}(p,a)^{28}\text{Si}$ and $^{35}\text{Cl}(p,a)^{36}\text{Ar}$ ", B.H. Moazen, **C. Matei**, D.W. Bardayan, J.C. Blackmon, K.Y. Chae, K.A. Chipps, R. Hatarik, K.L. Jones, R.L. Kozub, P.D. O'Malley, C.D. Nesaraja, S.D. Pain, W.A. Peters, S.T. Pittman, J.F. Shriner, and M.S. Smith, **Eur. Phys. J. A** **47**, 66 (2011)
19. "The $^{28}\text{Si}(p,t)^{26}\text{Si}^*(p)$ reaction and implications for the astrophysical $^{25}\text{Al}(p,g)^{26}\text{Si}$ reaction rate", K.A. Chipps, D.W. Bardayan, K.Y. Chae, J.A. Cizewski, R.L. Kozub, J.F. Liang, **C. Matei**, B.H. Moazen, S.D. Pain, W.A. Peters, S.T. Pittman, K.T. Schmitt, and M.S. Smith, **Phys. Rev. C** **82**, 045803 (2010)
20. "Inelastic $^{17}\text{F}(p,p)^{17}\text{F}$ scattering at $E_{\text{c.m.}}=3$ MeV and the $^{14}\text{O}(a,p)^{17}\text{F}$ reaction rate", D.W. Bardayan, J.C. Blackmon, K.Y. Chae, M.E. Howard, **C. Matei**, W. Martin, M. Matos, B.H. Moazen, C.D. Nesaraja, W.A. Peters, S.T. Pittman, M.S. Smith, and I. Spassova, **Phys. Rev. C** **81**, 065802 (2010)
21. "Direct measurements of (p,g) cross sections at astrophysical energies using radioactive beams and the Daresbury Recoil Separator", D.W. Bardayan, K.A. Chipps, R.P. Fitzgerald, J.C. Blackmon, K.Y. Chae, A.E. Champagne, U. Greife, R. Hatarik, R.L. Kozub, **C. Matei**, B.H. Moazen, C.D. Nesaraja, S.D. Pain, W.A. Peters, S.T. Pittman, J.F. Shriner, M.S. Smith, **Eur. Phys. J. A** **42**, 457 (2009)
22. "Constrain on the astrophysical $^{18}\text{Ne}(a,p)^{21}\text{Na}$ reaction rate through a $^{24}\text{Mg}(p,t)^{22}\text{Mg}$ measurement", K.Y. Chae, D.W. Bardayan, J.C. Blackmon, K.A. Chipps, R. Hatarik, K.L. Jones, R.L. Kozub, J.F. Liang, **C. Matei**, B.H. Moazen, C.D. Nesaraja, S.D. Pain, S.T. Pittman, and M.S. Smith, **Phys. Rev. C** **79**, 055804 (2009)
23. "First Direct Measurement of the $^{17}\text{F}(p,g)^{18}\text{Ne}$ Cross Section", K.A. Chipps, D.W. Bardayan, J.C. Blackmon, K.Y. Chae, U. Greife, R. Hatarik, R.L. Kozub, **C. Matei**, B.H. Moazen, C.D. Nesaraja, S.D. Pain, W.A. Peters, S.T. Pittman, J.F. Shriner, Jr., and M.S. Smith, **Phys. Rev. Lett.** **102**, 152502 (2009)
24. "Spectroscopic study of low-lying ^{16}N levels", D.W. Bardayan, P.D. O'Malley, J.C. Blackmon, K.Y. Chae, K.A. Chipps, J.A. Cizewski, R. Hatarik, K.L. Jones, R.L. Kozub, **C. Matei**, B.H. Moazen, S.D. Pain, W.A. Peters, S.T. Pittman, J.F. Shriner, Jr., and M.S. Smith, **Phys. Rev. C** **78**, 052801(R) (2008)
25. "Measurement of Branching Ratios from the 7.12-MeV State in ^{16}O and the $^{12}\text{C}(a,g)^{16}\text{O}$ Reaction Cross Section", **C. Matei**, C.R. Brune, and T.N. Massey, **Phys. Rev. C** **78**, 065801 (2008)
26. "Measurement of the cascade transition via the first excited state of ^{16}O in the $^{12}\text{C}(a,g)^{16}\text{O}$ reaction, and its S factor in stellar helium burning", **C. Matei**, L. Buchmann, W.R. Hannes, D.A. Hutcheon, C. Ruiz, C. R. Brune, J. Caggiano, A.A. Chen, J. D'Auria, A. Laird, M. Lamey, Z.H. Li, W.P. Liu, A. Olin, D. Ottewell, J. Pearson, G. Ruprecht, M. Trinczek, C. Vockenhuber, and C. Wrede, **Phys. Rev. Lett.** **97**, 242503 (2006)

INVITED TALKS (selected)

1. “The Path to Accurate Measurements with Gamma Beams”, Nuclear Physics in Stellar Explosions 2018, Debrecen, Hungary, 13th September 2018
2. “Neutron Detection for Monitoring Gamma Beams at ELI-NP”, Neutron Users Club 2017, National Physical Laboratory, Teddington, UK, 24th October 2017
3. “Nuclear Astrophysics with Gamma Beams at ELI-NP”, 9th European Summer School on Experimental Nuclear Astrophysics, Santa Tecla, Italy, 20th September 2017
4. “Nuclear Physics Experiments with Gamma Beams at ELI-NP”, Turkish Physical Society 33rd International Physics Congress – TPS33, Bodrum, Turkey, 7th September 2017
5. “Gamma Beam Diagnostics and Experiments at ELI-NP”, NIF Group Seminar, Nuclear and Chemistry Division, Lawrence Livermore National Laboratory, Livermore, CA, 25th October 2016
6. “ELI-NP Nuclear Physics and Applications with High-Brilliance Monochromatic Gamma Beam”, ELI and HILASE Summer School, Prague, Czech Republic, 25th August 2016
7. “From Big Bang to Stellar Helium Burning at ELI-NP”, 9th International Balkan School on Nuclear Physics, Constanta, Romania, 15th July 2016
8. “How to Prepare an Experiment using the Gamma Beam System at ELI-NP”, Carpathian Summer School of Physics 2016, Sinaia, Romania, 1st July 2016
9. “Nuclear Astrophysics Measurements with ELISSA at ELI-NP”, Nuclear Physics Group Seminar, University of York, York, United Kingdom, 8th March 2016
10. “ELI-NP: Gamma Beam System and Experiments”, Neutron Physics Group Seminar, Nuclear Physics Institute, Rez, Czech Republic, 28th January 2016
11. “Stellar Helium Burning: Precision Nuclear Astrophysics?”, Nuclear Astrophysics Workshop, Sungkyunkwan University, Suwon, South Korea, October 2013
12. “National Physical Laboratory and the Neutron Metrology Group”, Korea Research Institute for Science and Standards, Daejeon, South Korea, October 2013
13. “R-matrix analysis of the $^{12}\text{C}(\text{a,g})^{16}\text{O}$ reaction”, Nuclear Physics Group Seminar, University of Tennessee, Knoxville, TN, February 2009
14. “VANDLE - Neutron Detector Array for Nuclear Reactions and Decay Studies”, Stewardship Science Workshop, Lawrence Livermore National Laboratory, Livermore, CA, October 2008.
15. “Development of a Versatile Array for Neutron Detection”, Stewardship Science Workshop, Los Alamos National Laboratory, Los Alamos, NM, October 2007.
16. “New measurements of the $^{12}\text{C}(\text{a,g})^{16}\text{O}$ reaction”, Nuclear Physics Group Seminar, Argonne National Laboratory, Argonne, June 2006
17. “New measurements of the $^{12}\text{C}(\text{a,g})^{16}\text{O}$ reaction”, Nuclear Physics Group Seminar, KU Leuven, Leuven, June 2006
18. “New measurements of the $^{12}\text{C}(\text{a,g})^{16}\text{O}$ reaction”, Nuclear Astrophysics Group Seminar, Oak Ridge National Laboratory, Oak Ridge, May 2006
19. “New measurements of the $^{12}\text{C}(\text{a,g})^{16}\text{O}$ reaction”, TUNL Seminar, Duke University, Durham, March 2006

Catalin Matei

CONFERENCE TALKS (selected)

1. "First measurement of the ${}^7\text{Li}(\gamma,t){}^4\text{He}$ cross section using mono-energetic γ -ray beams", **C. Matei** et al., Nuclear Physics in Astrophysics IX, Frankfurt, Germany, September 2019
2. "Neutron Detectors for the Gamma Beam Intensity and Polarization Monitoring at ELI-NP", **C. Matei**, D.L. Balabanski, V. Iancu, A. Pappalardo, G. Suliman, C.A. Ur, The 2017 International Conference on the Applications of Nuclear Techniques, Crete, Grece, June 2017
3. "Instruments for Measuring the Intensity of the Gamma Beam at ELI-NP", **C. Matei**, A. Pappalardo, G. Suliman, C.A. Ur, International Conference on Advancements in Nuclear Instrumentation, Measurement Methods and their Applications, Liege, Belgium, June 2017
4. "Proposed nuclear astrophysics measurements with ELISSA at ELI-NP", **C. Matei**, D.L. Balabanski, Y. Xu, M. LaCognata, C. Spitaleri, The 2nd Sicily-East Asia Workshop on Low-energy Nuclear Physics, Waco, Japan, June 2016
5. "Gamma beam monitoring instruments at ELI-NP", **C. Matei**, J.M. Mueller, G. Suliman, C.A. Ur, H.R. Weller, 2015 European Nuclear Physics Conference, Groningen, Netherlands, September 2015
6. "Photodisintegration reactions for nuclear astrophysics studies at ELI-NP", **C. Matei**, D. Balabanski and O. Tesileanu, Nuclear Physics in Astrophysics VII, York, UK, May 2015
7. "Recent measurements using monoenergetic and thermal neutrons at the National Physical Laboratory", **C. Matei**, N.P. Hawkes, N.J. Roberts, G.C. Taylor, D. J. Thomas, Workshop on Accelerator based Neutron Production ABNP 2014, Padova, Italy, April 2014
8. "Measurements of the neutron-induced fission cross section of ${}^{242}\text{Pu}$ ", **C. Matei**, D.J. Thomas, J. Heyse, A.J.M. Plompen, IOP Nuclear Physics Group Conference, Surrey, UK, April 2014
9. "Neutron detector characterization for SCINTIA array", **C. Matei**, F.-J. Hamsch, S. Oberstedt, International Conference on Advancements in Nuclear Instrumentation, Measurement Methods and their Applications, Gent, Belgium, June 2011
10. "Direct Measurement of Low Energy Resonances in ${}^{31}\text{P}(p,g){}^{28}\text{Si}$ and ${}^{35}\text{Cl}(p,g){}^{36}\text{Ar}$ ", **C. Matei**, B.H. Moazen, D.W. Bardayan, J.C. Blackmon, K.Y. Chae, K.A. Chipps, R. Hatarik, K.L. Jones, S.D. Pain, W.A. Peters, and M.S. Smith, 2009 American Physical Society April Meeting, Denver CO, April 2009.
11. "Development of a Versatile Array of Neutron Detectors at Low Energy", **C. Matei**, D.W. Bardayan, J.C. Blackmon, J.A. Cizewski, R.K. Grzywacz, S.N. Liddick, S. D. Pain, S. W. Padgett, W. A. Peters, F. Sarazin, 2008 Annual Meeting of the Division of Nuclear Physics, Oakland CA, October 2008.
12. "First Measurement of the Cascade Transition via the 6.049-MeV State of ${}^{16}\text{O}$ in the ${}^{12}\text{C}(a,g){}^{16}\text{O}$ Reaction", **C. Matei**, L. Buchmann, C. Ruiz, C. R. Brune, J. Caggiano, A.A. Chen, J. D'Auria, A. Laird, G. Ruprecht, M. Trinczek, C. Vockenhuber, and C. Wrede, April 2007 Meeting of the American Physical Society, Jacksonville FL, April 2007
13. "Investigation of Plastic Scintillator Detector Configurations for Neutron Studies", **C. Matei**, D.W. Bardayan, J.C. Blackmon, J.A. Cizewski, S.D. Pain, W.A. Peters, R.K. Grzywacz, K.L. Jones, S.N. Liddick, 2007 Annual Meeting of the Division of Nuclear Physics, Newport News VA, October 2007
14. "Measurement of the cascade cross section to the 6.049-MeV state in ${}^{16}\text{O}$ in ${}^{12}\text{C}(a,g){}^{16}\text{O}$ ", **C. Matei**, L. Buchmann, et al., Oral Contribution at the Nine International Symposium on Nuclei in the Cosmos, Geneva, Switzerland, June 2006
15. "Branching ratio measurements of the 7.12-MeV state in ${}^{16}\text{O}$ ", **C. Matei** and C.R. Brune, Division of Nuclear Physics Fall Meeting, Chicago IL, October 2004