Antonella Saracino

Curriculum Vitae

120 E. Cameron Ave., 27599, Chapel Hill, NC, USA | (+1)984-261-9297 | asaracino@unc.edu |

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Education & Research

2021-Expected December 2025	**Ph.D. in Physics** University of North Carolina at Chapel Hill & Triangle Universities Nuclear Laboratory (USA) **Supervisor:** Prof. A. D. Ayangeakaa
Jan-July 2021	**Research Internship** Institut Laue-Langevin, Grenoble (France) **Tutor:** Dr. C. Michelagnoli
2021	**Master's Degree in Physics** University of Milano "La Statale", Milan (Italy) **Thesis:** "Structure of the ^{161}Gd nucleus populated in neutron capture reactions on a highly isotopically enriched target" **Supervisors:** Prof. S. Leoni and Dr. C. Michelagnoli
2019	**Bachelor's Degree in Physics** University of Bari "Aldo Moro", Bari (Italy) **Thesis:** "Study of the performance of the ALPIDE silicon pixel detector as an intr-operatory probe in radioguided oncological surgery" **Supervisor:** Dr. V. Manzari

Research Activities

My first experience as a researcher was at the Institut Laue-Langevin (ILL) during the internship for my Master Thesis, where I investigated the nucleus ^{161}Gd following the (n, γ) reaction, using the FIPPS gamma-ray spectrometer. The aim was twofold: to obtain accurate cross-section data relevant for the production of the medically important ^{161}Tb isotope, and to explore the interplay between quasi-particle and collective structures through nuclear spectroscopy in the $A \approx 160$ mass region. In addition, precise measurements of the ^{160}Gd(n, γ) reaction are also crucial for nuclear astrophysics: the neutron-capture cross sections of gadolinium isotopes are key to understanding the s-process in stellar nucleosynthesis.

At the beginning of my Ph.D program, my research was focused on the structure of nuclei in the $A \approx 60-70$ mass region that has been extensively scrutinized in a variety of experimental and theoretical investigations carried on over the past three decades. It pivots on studying the changes in shell structure associated with increasing neutron excess and angular momentum, the corresponding shape/phase transitions and coexistence as well as the emergence of collective behavior. Specifically, I devoted part of my research to study in detail those nuclei, which, in addition to collective excitations at "normal" deformation ($\beta_2 \approx 0.2-0.3$), exhibit a so-called superdeformation.

In the second part of the program my investigation was focused on the comprehensive study of the electric and magnetic dipole strength distribution in the transitional nucleus,^{102}Ru. Understanding these distributions is essential in the theoretical modeling of a wide range of nuclear phenomena, including stellar nucleosynthesis, medical isotope production, fission and fusion reactor technologies. A significant emphasis was placed on identifying the previously unresolved "Scissors Mode" - a collective M1 excitation occurring in the $3-5$ MeV range. This study contributes to a deeper understanding of the electromagnetic properties of ^{102}Ru, thereby enhancing a broader understanding of nuclear dynamics and excitations in this critical mass region.

As part of the local team of Triangle Universities Nuclear Laboratory (TUNL), I contribute to the preparation of the setup and support for experiments at the HIγS facility. I also have been involved in experiments at other facilities such as Extreme Light Infrastructure Nuclear Physics (ELI NP), INFN -Laboratori Nazionali di Legnaro and Argonne National Laboratory (ANL) where I've been working using Gammasphere and Gretina arrays.

Experience and School

Year	Event
2024	Exotic Beam Summer School 2024, Argonne National Laboratory, USA
2024	Organizer of the TILT Talks at Triangle Universities Nuclear Laboratories for the Research Experiences for Undergraduates program by the National Science Foundation
2022	La Rábida - Euroschool on Exotic Beams, La Rábida, Spain
2020	Official visitor of the national L.E.N.A. laboratory and nuclear reactor in Pavia (IT)
2019	Official visitor of the IRCSS National Cancer Institute in Milan (IT)
2017, 2018	Organizer of the European Researchers' Night, Bari (IT)

Scientific Communications

Year	Event
2024	Contribution at Nuclear Structure Conference
2024	Contribution at Exotic Beam Summer School at Argonne National Laboratory
2023	Scientific Communication at the 109° Congresso Nazionale della Società Italiana di Fisica
2023	Contribution at the Nuclear Chemistry - Gordon Research Conference "Patterns and Reactions of Exotic Nuclei"
2023	Invited talk for the Nuclear Chemistry - Gordon Research Seminar "Novel Developments in Nuclear Reaction, Structure and Astrophysics"
2023	Seminar at Triangle Universities Nuclear Laboratory
2022	Contributed talk at the Fall Meeting of the Division of Nuclear Physics of the American Physical Society
2022	Contribution at La Rábida - Euroschool on Exotic Beams
2021	Scientific Communication at the 107° Congresso Nazionale della Società Italiana di Fisica

Mentoring Experience of Junior Researchers

Year	Student
2025	Zichen Wang, REU student
2025	Jiahao Tang, Undergraduate Student for Honor Thesis
2024	Maria Florencia Nardone, REU Student
2023	Benjamin Atticus Johnson, Undergraduate Student for Honor Thesis

Skills

- **Computer Skills:** C, C++, PYTHON, ROOT, RADWARE, CUBIX, HDTV, WOLFRAM MATHEMATIC, GEANT4
- **Languages:** Proficient in English and Italian, beginner in French

Publications

1. **A. Saracino**, A.D. Ayangeakaa, Q. Chen, S. Frauendorf, S. R. Johnson, R. V. F. Janssens, E. Churchman, S. Finch, D. Gribble, F. E. Idoko, X. K.-H. James, T. M. Kowalewski, M. Lee, A. Psaltis, K. Song. *Low-energy dipole strength distribution in ^{102}Ru: Coexistence of scissors and octupole resonances*, **In Preparation**

2. F.E. Idoko, A.D. Ayangeakaa, N. Sensharma, C.J. Chiara, S. Zhu, E.A. McCutchan, **A. Saracino**, R.V.F. Janssens, H.M. Albers, S. Balderrama, L. Canete, J. Carroll, M.P. Carpenter, P. Copp, D.T. Doherty, P. Golubev, D.J. Hartley, A.B. Hayes, Y. Hrabar, H. Jayatissa, M. Miranda, C.M. Gatermann, N.N. O'Briant, M. Siciliano, F.G. Kondev, T.M. Kowalewski, T. Lauritsen, W. Reviol, D. Rudolph, J. Rufino, D. Seweryniak, J.R. Vanhoy, W.B. Walters, G.L. Wilson *High-spin spectroscopy and the onset of quasicollective structures in ^{69}Ga*, **nucl-ex: 2510.01423**

3. T.M. Kowalewski, A.D. Ayangeakaa, N. Sensharma, R.V.F. Janssens, Y.M. Wang, Q.B. Chen, J.M. Allmond, C.M. Campbell, S.R. Carmichael, M.P. Carpenter, P. Copp, C. Cousins, M. Devlin, U. Garg, C.M. Gatermann, T.J. Gray, D.J. Hartley, J. Heery, J. Henderson, H. Jayatissa, S.R. Johnson, S.P. Kisyov. F.G. Kondev, T. Lauritsen, S. Nandi, R. Rathod, W. Reviol, M. Rocchini, E. Rubino, R. Russel, **A. Saracino**, D. Seweryniak, M. Siciliano, C.Y. Wu. *Triaxiality and shape*

dynamics in ^{70}Ge, **Phys.Rev.C 112 (2025) 3, 034332**

4. N. Sensharma, A.D. Ayangeakaa, T.M. Kowalewski, R.V.F. Janssens, Y.M. Wang, Q.B. Chen, J.M. Allmond, C.M. Campbell, S.R. Carmichael, M.P. Carpenter, P. Copp, C. Cousins, M. Devlin, U. Garg, C.M. Gatermann, D.J. Hartley, J. Heery, J. Henderson, H. Jayatissa, S.R. Johnson, S.P. Kisyov. F.G. Kondev, T. Lauritsen, S. Nandi, R. Rathod, W. Reviol, M. Rocchini, E. Rubino, R. Russel, **A. Saracino**, D. Seweryniak, M. Siciliano, C.Y. Wu.*Evidence for Triaxial shape coexistence in ^{74}Ge*, **Phys.Rev.C 112 (2025) 2, 024311**

5. D. Gribble, C. Iliadis, R.V.F. Janssens, U. Friman-Gayer, A.D. Ayangeakaa, A. Champagne, E. Churchman, W. Fox, S. Frye, X. K.-H. James, S. R. Johnson, R. Longland, **A. Saracino**, N. Sensharma, K. Song, C. Wegner. *Investigation of ^{31}P levels near the proton threshold by Nuclear Resonance Fluorescence and the impact on the $^{30}Si(p,\gamma)^{31}P$ thermonuclear rate*, **Phys.Rev.C 112 (2025) 2, 025804**

6. D. Savran, J. Isaak, A.D. Ayangeakaa, M. Beuschlein, S.W. Finch, D. Gribble, A. Gupta, J. Hauf, X.K.-H. James, R.V.F. Janssens, S.R. Johnson, P. Koseoglou, T.M. Kowalewski, B. Löher, O. Papst, N. Pietralla, J. Rohrer, **A. Saracino**, N. Sensharma, W. Tornow, V. Werner. *Transition width of the $J^\pi = 1^-$ two-phonon state of ^{88}Sr*, **Phys.Rev.C 110 (2024) 2, 024312**

7. N. Sensharma, U. Garg, Q.B. Chen, S. Frauendorf, S. Zhu, J. Arroyo, A. D. Ayangeakaa, D.P. Burdette, M.P. Carpenter, P. Copp, J. L. Cozzi, S. S. Ghugre, D. J. Hartley, K.B. Howard, R.V.F. Janssens, F.G. Kondev, T. Lauritsen, J. Li, R. Palit, **A. Saracino**, D. Seweryniak, S. Weyhmiller, J. Wu.*Evolution of chirality from transverse wobbling in ^{135}Pr*, **nucl-ex: 2403.10749**

8. **A. Saracino**, S. Zhu, N. Sensharma, A.D. Ayangeakaa, R.V.F. Janssens, Q.B. Chen, M.P. Carpenter, P. Chowdhury, A. Gade, F.G. Kondev, T.M. Kowalewski, T. Lauritsen, E. A. McCutchan, D. Seweryniak . *Collective modes of excitation in ^{64}Cu*, **Phys.Rev.C 109 (2024) 2, 024319**

9. **A. Saracino**, C. Michelagnoli, G. Colombi, U. Köster, N. Cieplicka-Oryńczac, S. Leoni et al."*Spectroscopy of ^{161}Gd after neutron induced reactions on an high purity target*, **In Preparation**