ERIC PUTNEY

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EDUCATION

Ph.D Candidate | *Rutgers, The State University of New Jersey* — August 2020 – Present

B.S *summa cum laude* Physics | *The University of New Mexico* — September 2016 – May 2020

RESEARCH

Normalizing Flows Learning Galactic Dynamics — January 2021 – Present
Advisor: Dr. Matthew Buckley — *Rutgers | New Brunswick, New Jersey*

- Training normalizing flows on nearby stars from the Gaia DR3 dataset.
- Developed non-parametric Jeans analysis in a hydrodynamically-simulated galaxy.

Neutrino Flavor Dynamics in Core-Collapse Supernovae — October 2018 – May 2020
Undergraduate Honors Thesis | Advisor: Dr. Huaiyu Duan — *UNM | Albuquerque, New Mexico*

- Wrote a Python library to streamline analyses of dense neutrino gases evolving in supernovae.
- Compared numerical simulations of neutrino oscillations in dense matter to analytic predictions.

GBAR Positronium Excitation Laser — June 2019 – August 2019
NSF REU | Advisor: Dr. Pauline Comini — *CERN | Geneva, Switzerland*

- Wrote a Python library that enabled remote control of the GBAR positronium excitation laser.
- Calibrated beam stabilization and installed a water-cooled heat sink for improved thermal management.

PRESENTATIONS AND PUBLICATIONS

Publications

- Measuring Galactic Dark Matter through Unsupervised Machine Learning. arXiv astro-ph & hep-ph, May 2022
- What Dark Matter Halos Tell Us About Dark Matter. (Unpublished Masters Thesis, November 2021)
- Numerical Analysis of Collective Neutrino Oscillations in Dense Neutrino Media. (Unpublished Honors Thesis, May 2020)
- Measurement of the radial matrix elements for the $6s^2S_{1/2} \rightarrow 7p^2P_J$ transitions in cesium. (Published June 2019, *DOI 10.1103/PhysRevA.99.062510*)

Presentations

- What Dark Matter Halos Tell Us About Dark Matter | November 2021, Rutgers. *Slides.*
- Numerical Analysis of Collective Neutrino Oscillations in Dense Neutrino Media | April 2020, UNM. *Slides*, *Poster.*
- Laser Control for the Production of Excited Positronium in GBAR. | August 2019, CERN. *Slides.*
- Numerical Analysis of Collective Neutrino Oscillations in Core-Collapse Supernovae with Multidimensional Models | April 2019, UNM Physics Day. *Slides.*
- Precision Measurement of the $6S \rightarrow 7P_{1/2}$ Cesium Transition Radial Matrix Element via Simultaneous Absorption Spectroscopy. | October 2018 APS Four Corners, University of Utah. *Abstract*, *Slides.*
- Analysis of Diffusion of a Rhodium Adatom on a Tungsten (111) Surface. | October 2017 APS Four Corners, Colorado State University. *Abstract*, *Poster.*

SCHOLARSHIPS AND AWARDS

2021 Rutgers Academic Fellowship

2020 Eion Gray Scholarship

2020 UNM Feynman Award

2019 Goldwater Scholar

2019 Rayburn Outstanding Student in Laboratory Physics and Astronomy

REFERENCES

Dr. Matthew Buckley
Rutgers, The State University of New Jersey, Department of Physics and Astronomy
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Dr. Huaiyu Duan
The University of New Mexico, Department of Physics and Astronomy
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Dr. Pauline Comini
CEA, Département de Physique des Particules
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