Kelsey Lund

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EXPERIENCE

2024 - Present **UC Berkeley / Institute for Nuclear Theory** *N3AS Postdoctoral Fellow*, Seattle, WA
2020 - 2024 **Los Alamos National Laboratory** *Graduate Research Assistant*, Los Alamos, NM
2018 - 2024 **North Carolina State University** *Graduate Research Assistant*, Raleigh, NC
2016-2017 **National Radio Astronomy Observatory** *Undergraduate Research Assistant*

EDUCATION

2024 **Ph.D. Physics** North Carolina State University, Raleigh, NC
Dissertation Title *"How the Gentle Winds Beckon: r-Process Nucleosynthesis in Neutron Star Merger Winds"*
2020 **M.S. Physics** North Carolina State University, Raleigh, NC
2017 **B.S. Physics** University of California San Diego, La Jolla, CA

PUBLICATIONS

K.A. Lund, R. Somasundaram et al. "Kilonova Emissions from Neutron Star Merger Remnants: Implications for Nuclear Equation of State", *arXiv:2408.07686* (2024)

M.R. Mumpower, T.M. Sprouse, J.M.Miller, **K.A. Lund** et al. "Nuclear Uncertainties Associated with the Ejecta of a Neutron-Star Black-Hole Accretion Disk", *accepted to The Astrophysical Journal* (2024)

K.A. Lund, G.C. McLaughlin et al. "Magnetic Field Strength Effects on Nucleosynthesis from Neutron Star Merger Outflows", The Astrophysical Journal, 964, 111 (2024)

T.M. Sprouse, **K.A. Lund** et al. "Emergent Nucleosynthesis from a 1.2 Second Long Simulation of a Black-Hole Accretion Disk", The Astrophysical Journal 962, 79 (2024)

E.M. Holmbeck, J. Barnes, **K.A. Lund**, et al. "Superheavy Elements in Kilonovae", Astrophysical Journal Letters 951, L13 (2023)

K.A. Lund, J. Engel et al. "The Influence of Beta Decay Rates on r-Process Observables", The Astrophysical Journal 944, 144 (2023)

J. Barnes, Y.L. Zhu, **K.A. Lund**, et al."Kilonovae Across the Nuclear Physics Landscape: the Impact of Nuclear Physics Uncertainties on r-Process Powered Emission", The Astrophysical Journal 918, 44 (2021)

Y.L. Zhu, **K.A. Lund** et al. "Modeling Kilonova Light Curves: Dependence on Nuclear Physics Inputs" The Astrophysical Journal 906, 94 (2021)

PRESENTATIONS

Invited Talks

2024 Jul **Los Alamos National Laboratory T-2 Seminar**
"How the Gentle Winds Beckon: r-Process Nucleosynthesis in Neutron Star Merger Winds" (Los Alamos, NM)
BRIDGCE-IReNA 2024
"Magnetic Field Strength Effects on Nucleosynthesis from Neutron Star Merger Outflows" (Guildford, UK)
2024 Jan **Caltech Astronomy Tea Talk**
"Magnetic Field Effects on r-Process Nucleosynthesis in Post-Merger Disk Outflows" (Pasadena, CA)
2023 Oct **University of Minnesota Nuclear Theory Seminar**
"To The Actinides and Beyond: Nucleosynthesis in Neutron Star Merger Disks" (virtual)
2023 Sep **ECT* Workshop: MICRA (Microphysics in Computational Relativistic Astrophysics)**
"Magnetic Field Effects on Nucleosynthesis in Post-Merger Disk Outflows" (Trento, Italy)
2023 Aug **INT Program 23-2- Astrophysical Neutrinos and the Origin of the Elements**
"A "Beta" Look at Post-merger Nucleosynthesis" (Seattle, WA)
2023 Apr **Virginia Tech Astronomy Seminar**
Uncertainties and Opportunities in r-Process Observables (Blacksburg, VA)
2022 Oct **Remnants of Neutron-Star Mergers: Connecting Hydrodynamics Models to Nuclear, Neutrino, and Kilonova Physics**
Key Uncertainties in Astrophysical r-process Nucleosynthesis (Darmstadt, Germany)
2022 Aug **N3AS Seminar**
"Effects of Nuclear Uncertainties on r-Process Observables" (virtual)
Los Alamos National Laboratory T-Division Seminar
"Probing Sources of Uncertainty in Kilonova Modeling" (Los Alamos, NM)

2021 Oct **Universitat Politècnica de Barcelona**
"Nucleosynthesis in the Universe" (Barcelona, Spain)
INT Program 21-3- Radionuclides: Nuclear Physics, Astrophysical Models, and Observations
"Nuclear Physics in Kilonova Modeling" (virtual)

Contributed Talks

2023 Jul **T-Division Student Lightning Talks**
Magnetic Field Strength Effects on Nucleosynthesis in Merger Driven Outflows (Los Alamos, NM)

2022 Sep **International School of Nuclear Physics, 43rd Course**
Kilonova Modeling: Nuclear Physics, Magnetic Fields, Neutrinos (Erice, Sicily)

2022 Aug **T-Division Student Lightning Talks**
Magnetic Fields in Kilonova Modeling (Los Alamos, NM)
Awarded 1st Place prize
N3AS Summer School in Multi-Messenger Astrophysics
Kilonova Modeling (Santa Cruz, CA)

2022 Jul 15th **International Conference on Nuclear Data for Science and Technology**
Probing Nuclear Uncertainties in Kilonova Modeling (virtual)
Center for Nonlinear Studies Student Series
Kilonova Modeling: Magnetic Fields, Neutrinos, Nuclear Physics (Los Alamos, NM)

2022 Jan **ChETEC-INFRA Schools on Nuclear Astrophysics Questions**
Actinide Dating Stars: Nuclear Uncertainties in Cosmic Age (virtual)

2021 Jun **ECT* Workshop: KRINA (Key Reactions in Nuclear Astrophysics)**
Sensitivity of the Observed Kilonova Signal to Nuclear Physics (virtual)

2020 Nov **SESAPS Meeting**
Identification of Key Isotopes in Kilonova Heating (virtual)
APS Division of Nuclear Physics Meeting
Identification of Key Isotopes in Kilonova Heating (virtual)

2020 Jul **FIRE Collaboration Annual Meeting**
Identification of Key r-Process Isotopes in Kilonova Heating (virtual)

2019 Oct **APS Division of Nuclear Physics Meeting**
Uncertainties in Kilonova Heating from Nuclear Physics Inputs (Crystal City, VA)

2019 Jun **FIRE Collaboration Annual Meeting**
Uncertainties in Kilonova Light Curves from Nuclear Physics: A Case Study (Upton, NY)

2016 **NRAO Seminar Series**
Probing Magnetized Turbulence in the Fermi Bubbles (Socorro, NM)
APS Pacific Coast Gravity Meeting
On The Astrophysical Origin of the Elements (Fullerton, CA)

2014 **Honors Transfer Council of California Research Conference**
Quantum Relativistic Effects on Inorganic Matter (Irvine, CA)

Posters

2023 Sep **17th International Symposium on Nuclei in the Cosmos**
Magnetic Field Effects on Nucleosynthesis from Merger Outflows (Daejeon, Korea)
Awarded prize for Outstanding Poster Presentation

2022 May **JINA Frontiers in Nuclear Astrophysics Meeting**
Actinide-Dating Stars: Nuclear Uncertainties in Cosmic Age (South Bend, IN)

2022 Apr **North Carolina State University Graduate Student Research Symposium**
Actinide-Dating Stars: Nuclear Uncertainties in Cosmic Age (Raleigh, NC)

2017 Jan **AAS Winter Meeting**
Probing Magnetized Turbulence in the Fermi Bubbles (Grapevine, TX)

2016 Oct **NAC IV Workshop**
Probing Magnetized Turbulence in the Fermi Bubbles Washington, DC

FUNDING

2023 LANL Center for Nonlinear Studies Graduate Research Fellowship
EUSTIPEN Travel Grant
JINA Travel Grant
2022 Seaborg Institute Graduate Student Research Fellowship
LANL Center for Nonlinear Studies Graduate Research Fellowship
JINA Travel Grant
2019 EUSTIPEN Travel Grant
JINA Travel Grant

OUTREACH

2023 Jan **Astronomy Days** at North Carolina Museum of Natural Sciences (Raleigh, NC)
2022 Nov **Public Talk** at triangle Astronomy on Tap (Durham, NC)
2020 Jan **Astronomy Days** at North Carolina Museum of Natural Sciences (Raleigh, NC)
2018 Aug **LEAP Workshop** at North Carolina State University (Raleigh, NC)
2017 Jul **Designed** plan for **Galaxy Garden** at VLA visitor center (Magdalena, NM)
2017 Jul **Restored 2-dish interferometer** at Frank T. Etscorn Observatory (Socorro, NM)
2016 Jul **Public Tours** of Very Large Array (VLA) facilities (Magdalena, NM)

TEACHING

North Carolina State University

PY 125 - Astronomy Lab (Fall 2018)

University of California San Diego

PHYS 161 - Black Holes (Spring 2016, 2017)
PHYS 13 - Life in the Universe (Fall 2016)

PROFESSIONAL DEVELOPMENT

2022 N3AS Summer School in Multi-Messenger Astrophysics (Santa Cruz, CA)
JINA-CEE Frontiers in Nuclear Astrophysics Meeting (South Bend, IN)
2021 INT Workshop 21-79W: New Directions in Neutrino Flavor Evolution in Astrophysical Systems (virtual)
International Neutrino Summer School (virtual)
ECT* Workshop: Probing Nuclear Physics with Neutron Star Mergers (virtual)
International Workshop on Weak Interactions and Neutrinos (virtual)
2020 JINA-Horizons Workshop (virtual)
2019 ECT* Workshop: Nuclear and Astrophysics Aspects for the Rapid Neutron Capture Process in the Era of Multi-Messenger Observations (Trento, Italy)
FOE19 Fifty-one Erg Conference (Raleigh, NC)
JINA First Frontiers Summer School (East Lansing, MI)
2018 Neutron Physics Summer School (Raleigh, NC)

LANGUAGES

Native Proficiency: English, Spanish, Catalan
Working Proficiency: Italian
Elementary Proficiency: French, German
Computational: Python, HPC, Mathematica, Data Visualization

REFERENCES

Prof. Gail McLaughlin
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