

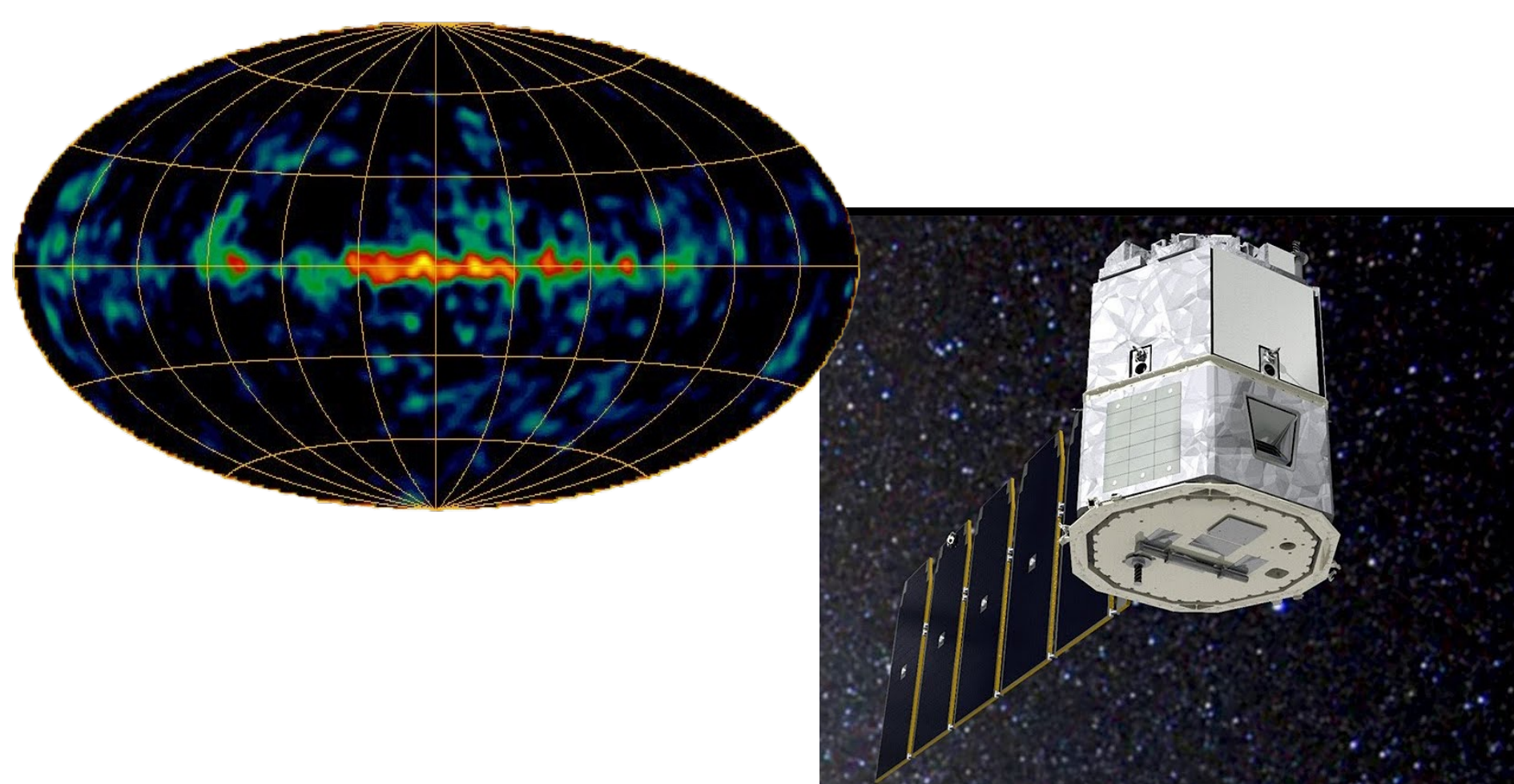


Improving Nuclear Data for Core-Collapse Supernova Research

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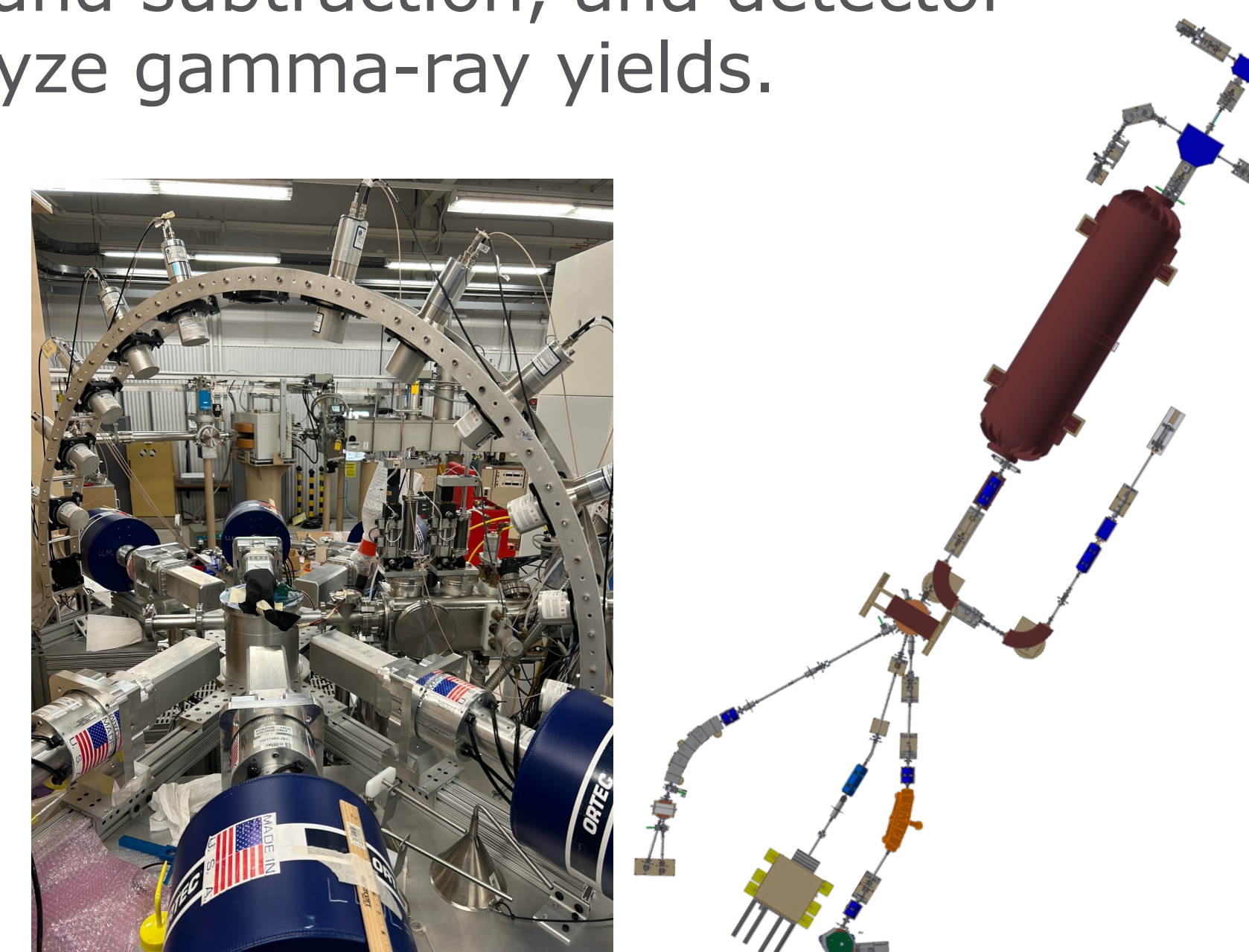
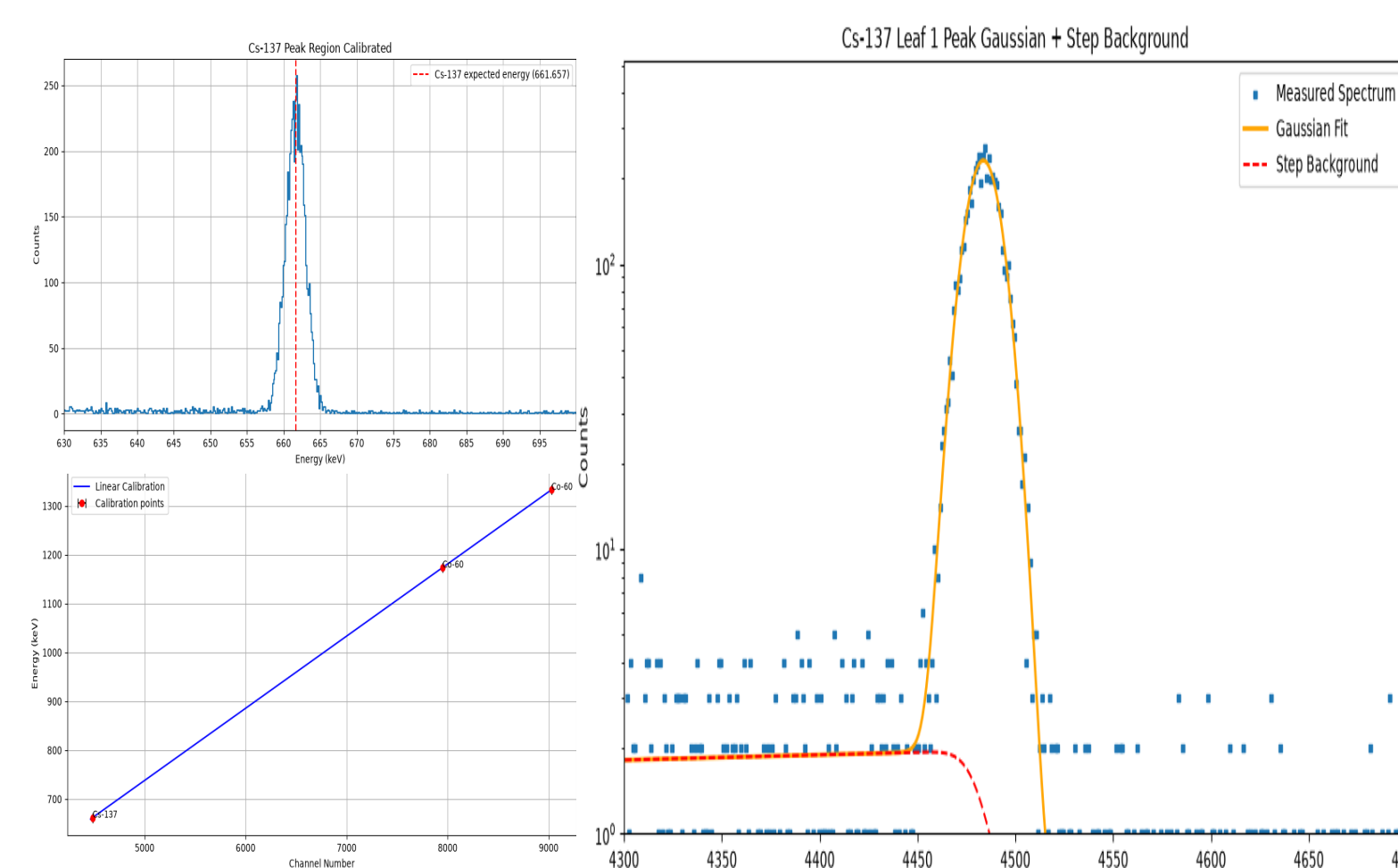
ABOUT ME

- Astrophysics B.S. Student, University of California, Merced
- I am passionate about expanding my knowledge of nuclear astrophysics and exploring the many research opportunities within the field. This internship has introduced me to a wide range of scientific disciplines and career paths, inspiring me to continue furthering my education through graduate study
- Being an LLF Fellow has enriched my internship experience by providing opportunities to connect with fellow interns and professionals while learning about the many career paths available.



SUMMER RESEARCH

- Core-collapse supernovae are important sites for explosive nucleosynthesis and play a central role in understanding the evolution of massive stars and chemical enrichment of the universe.
- Rapid nuclear reactions in collapsing core and high temperature ejecta help determine final isotopic abundances
- ^{44}Ti radioactive decay produces observable gamma-rays that can probe supernova nucleosynthesis and explosion mechanisms
- Sensitivity studies have identified the $^{27}\text{Al}(\alpha, n)^{30}\text{P}$ reaction as important to ^{44}Ti production under α -rich freeze out conditions
- In addition (α, n) reactions contribute to neutron production in passive nondestructive assays of actinide bearing materials used in safeguards, waste characterization, and nuclear material verification
- Existing (α, n) data show significant inconsistencies, limiting the accuracy of both astrophysical models and neutron sources
- Using Python and Jupyter Notebooks, I applied energy calibration, Gaussian peak fitting, background subtraction, and detector corrections to extract and analyze gamma-ray yields.



LLF AWARD

- The support provided by Lawrence Livermore Foundation allowed me to fully immerse myself in my research experience by covering essential living expenses during my internship. With fewer financial concerns, I was able to focus on learning, collaborating with researchers, and making the most of this opportunity.
- This experience has allowed me to gain hands on skills in programing and data analysis while working alongside accomplished scientists. Beyond the research itself, I have been introduced to a supportive community of mentors and interns, making this fellowship a valuable step in my scientific journey



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