

## Nuclei in the Cosmos (NIC XVII)



Contribution ID: 158

Type: **Invited**

### Novel Studies of Nucleosynthesis in the Lab

*Friday, 22 September 2023 14:00 (30 minutes)*

A variety of nucleosynthesis processes operate in our universe, producing elements across the nuclear chart. Using a range of tools and techniques, we can probe the nuclear reactions that comprise these processes. In explosive  $rp$ -process environments, direct reactions are possible using gaseous targets such as JENSA, with input from indirect techniques such as transfer reactions on both stable and radioactive isotopes. The role of long-lived isomeric states in  $rp$ -process nuclei, just as in  $^{26}\text{Al}$ , is beginning to be studied experimentally using beams of mixed ground state and isomer content, with indirect studies underway to populate the nuclear levels of interest, and direct measurements with SECAR planned. In supernovae, the mechanisms producing the rare  $p$ -process nuclei are being studied using monoenergetic gamma beams at the HIgS facility at TUNL. In this talk, I will provide a brief survey of these different experimental campaigns, and discuss the preliminary results and future directions.

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**Session Classification:** Nuclear properties for astrophysics

**Track Classification:** Nuclear properties for astrophysics