

# Unveiling Stellar Secrets: Advancements in Alpha-Induced Reaction Studies with the Multi Sampling Ionization Chamber Detector (MUSIC)

*Monday, June 10, 2024 3:30 PM (30 minutes)*

Several  $\alpha$ -induced reactions on both stable and radioactive isotopes play a crucial role in nuclear astrophysics, significantly contributing to the nucleosynthesis of light elements in the rapid neutron-capture process (r-process) within neutrino-driven winds post core-collapse supernovae and in X-ray burst nucleosynthesis. However, direct measurements of these reactions at relevant astrophysical energies pose significant challenges due to small cross sections and the complexities of handling low-intensity radioactive beams.

In this talk, I will present the Multi Sampling Ionization Chamber (MUSIC) detector, a detector designed for precise measurements of ionization energy loss in nuclear reactions. We'll explore MUSIC's principles, its role in studying  $\alpha$ -induced reactions, and recent experimental highlights. Additionally, we will introduce AMENA, a more advanced version of the MUSIC detector, featuring significant technological enhancements. These improvements, combined with advancements in experimental techniques and radioactive ion beam facilities, open new opportunities for exploring these critical reactions, paving the way for future research in nuclear astrophysics.

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