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Measurements of the 14,15 N(α , γ) 18,19 F reactions and prospect for other helium burning studies at Felsenkeller lab

Helium burning is a crucial phase for stellar evolution, playing a key role in the production of elements like carbon, oxygen, and fluorine, which significantly impact the chemical evolution of the Universe. Precise measurements of nuclear reaction rates at helium-burning astrophysical energies are challenging and essential for constraining stellar models and understanding nucleosynthesis pathways. We report on new measurements of the ¹⁴N(α , γ)¹⁸F and ¹⁵N(α , γ)¹⁹F reactions, performed at the Felsenkeller 5 MV accelerator laboratory in Dresden, Germany. These reactions contribute to fluorine production, an element whose origin remains a long-standing puzzle in nuclear astrophysics. Details on the experimental setup, preliminary results, and future plans for studying other key helium-burning reactions will be presented.

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