



Contribution ID: 105

Type: Poster

New Gas Target Setup for Nuclear Astrophysics Experiments at the Felsenkeller Underground Laboratory

Wednesday, October 16, 2024 6:09 PM (2 minutes)

Precise cross-section measurements in nuclear astrophysics demand targets with high thickness, purity, and stability. Traditional methods often struggle to achieve these requirements simultaneously. To address this challenge, we present a newly developed jet and extended windowless gas target system. Furthermore, the gas target is free of chemical contaminations.

We have developed a gas target that combines both jet and windowless extended gas targets, capable of operating in either mode with minimal adjustments. This setup has been thoroughly characterized at the HZDR center in Rossendorf and is currently undergoing recommissioning at the Felsenkeller underground lab. To enhance real-time monitoring of the gas jet, we employed advanced interferometry techniques.

Characterization of the jet target included absolute thickness determination using alpha energy loss methods and relative measurements via laser interferometry. Together, these approaches provide a comprehensive understanding and precise control of the target's properties.

With the jet gas target, we achieved a thickness of 10^{18} atoms/cm² at moderate inlet pressure, which is ideal for a wide range of nuclear reactions. Upon completion of the recommissioning process, the system will be fully operational, facilitating new opportunities for nuclear astrophysics research.

The author will report the detailed insights into this innovative gas target system's development, characterization, and operational capabilities, highlighting its potential to improve precision in cross-section measurements for nuclear astrophysics.

Summary

Author: YADAV, Anup (Helmholtz-Zentrum Dresden-Rossendorf (HZDR))

Co-authors: BEMMERER, Daniel (Helmholtz-Zentrum Dresden-Rossendorf); SCHMIDT, Konrad (Helmholtz-Zentrum Dresden-Rossendorf)

Session Classification: Poster session leading into social dinner buffet