Contribution ID: **251** Type: **Poster**

Development of a Multi-Purpose Optical TPC for Neutron-Induced Reaction Studies at SARAF

Wednesday 27 August 2025 18:00 (2 hours)

Neutron-induced reactions play a central role in stellar and Big Bang nucleosynthesis. Yet many of the relevant cross sections remain poorly constrained at astrophysically relevant energies. Addressing this need, we are developing a multi-purpose Optical Time Projection Chamber (OTPC) optimized for precision neutron-reaction studies at SARAF's upcoming high-intensity, time-of-flight neutron beam facility.
The detector combines a drift chamber filled with CF_4-based scintillating gas mixtures, fast photodetectors for prompt scintillation (S1) detection, and high-speed optical readout of avalanche-induced secondary scintillation (S2) to enable full 3D reconstruction of charged-particle tracks.
A prototype system has been assembled and tested. This has enabled systematic characterization of drift velocity, charge and light amplification, and initial optical imaging of alpha-particle tracks in various gas mixtures. These studies guide the design of a larger, fully integrated OTPC system intended for operation at SARAF.
In parallel, we are exploring advanced image sensors to further enhance tracking resolution. We report on recent progress with the prototype and outline the next steps toward commissioning the full system.

Collaboration you are representing

Author: Dr FELKAI, Ryan (Weizmann Institute of Science)

Presenter: Dr FELKAI, Ryan (Weizmann Institute of Science)

Session Classification: Poster session

Track Classification: Underground Laboratories