



Contribution ID: 585

Type: **Invited Talk for Parallel Sessions (Invitation Only)**

New directions for nuclear spectroscopy at the Australian Heavy Ion Accelerator Facility

Friday, 30 May 2025 08:30 (25 minutes)

The shell model has underpinned much of our understanding of nuclear structure for over 70 years. However, many fundamental questions about the nature of atomic nuclei remain unanswered. Obtaining high-quality data to determine key spectroscopic observables, such as electromagnetic transition strengths, and direct measurements of single- and two-nucleon properties form important steps towards attaining a deeper understanding of nuclear structure. In the current 'era of discovery' with advanced radioactive-ion-beam facilities, addressing these open questions in systems closer to stability remains a critical task.

The Australian Heavy Ion Accelerator Facility (HIAF) holds a distinguished track record with regards to developing innovative technical infrastructure to explore diverse aspects of pure and applied research in nuclear science. Several equipment upgrades in recent years have enhanced the nuclear-structure research program at HIAF. For decades, the CAESAR array of HPGe and LEPS detectors facilitated extensive research into the nature of nuclear isomers via time-correlated gamma-ray spectroscopy. The CAESAR target chamber has been upgraded with a compact arrangement of charged-particle detectors to facilitate Coulomb-excitation studies. The addition of six ultrafast, lanthanum-bromide detectors and a Pixie-16 digital data acquisition system has also successfully extended the access of experimental measurements to the 10s-of-picoseconds range. To complement this, significant engineering work has also been undertaken to restore the capacity of the HIAF Enge spectrometer to perform nuclear spectroscopy with high-resolution nucleon scattering and transfer reactions. In this presentation, I will discuss results of recent shell-model studies performed at HIAF and future prospects for nucleon-transfer-reaction studies with the new Enge focal-plane detector.

Primary author: Dr MITCHELL, AJ (Australian National University)

Presenter: Dr MITCHELL, AJ (Australian National University)

Session Classification: Parallel Session

Track Classification: Nuclear Structure