Contribution ID: **120** Type: **Invited talk**

Constraints on Nucleosynthesis Processes through Measurements in the Nuclear Quasi-Continuum

Monday 16 September 2024 16:50 (25 minutes)

The gamma-ray decay of nuclear states in the quasi-continuum provides significant constraints on nucleosynthesis processes. In particular, measurements of Nuclear Level Densities (NLDs) and Photon Strength Functions (PSFs) have and will continue to play a central role as these are inputs for the statistical Hauser-Feshbach model. This facilitates the extraction of neutron-capture cross-section data even for nuclei where direct measurements are not feasible. Now, PSF and NLD measurements in previously inaccessible regions of the nuclear chart have become possible due to many facilities worldwide offering enhanced or new state-of-the-art research infrastructure. These range from significant increases in efficiencies for particle and gamma-ray detectors to new or upgraded radioactive ion beam facilities. In parallel, several new experimental and analytical techniques have been developed, enabling more reliable PSF and NLD studies. This collective progress will undoubtedly yield unprecedented experimental constraints to nucleosynthesis processes.
I will provide an overview of recent developments in particular the Shape method, which allows for a model-independent extraction of NLDs and PSFs even for nuclei away from stability. Furthermore, I will discuss how our understanding of observed isotopic abundances can be enhanced through the measurement of PSFs and NLDs, using the i-process nucleus 67Ni as an example.

Primary author: WIEDEKING, Mathis (Lawrence Berkeley National Laboratory)

Presenter: WIEDEKING, Mathis (Lawrence Berkeley National Laboratory)

Session Classification: Plenary Session