

Nuclear data from the quasi-continuum

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The gamma-ray decay of nuclear states in the quasi-continuum provides important nuclear data for various applications, insights into nuclear structure effects and 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 we have entered an era of incredible potential for novel measurements. This is due to many institutes across the world having established programs to provide enhanced, 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 were developed, allowing for more reliable PSF and NLD studies, even on nuclei away from stability.

In this talk, I will provide an overview of the most recent and significant advances made and how these have laid the foundation for novel and ambitious measurements of PSFs and NLDs at radioactive and stable ion beam facilities. Such measurements will address future data needs for nuclear astrophysics and various applications ranging from medical isotope production, non-proliferation efforts, as well as fission and fusion reactor technologies. This growing interest across disciplines was a major motivation for the International Atomic Energy Agency's initiative to create and disseminate the first PSF database in 2019. An overview of a major database update, which will take place in the first half of 2024, will also be presented.

Author: Prof. WIEDEKING, Mathis (Lawrence Berkeley National Laboratory)

Presenter: Prof. WIEDEKING, Mathis (Lawrence Berkeley National Laboratory)