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Electromagnetic Dipole Response of Nuclei

The gamma-ray decay of nuclear states in the quasi-continuum provides important insights into nuclear structure effects and constraints to 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 are entering 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 which allow for more reliable PSF and NLD studies, even on nuclei away from stability. All this progress will undoubtedly lead to unprecedented insight into the structure of nuclei and provide reaction rates of relevance to nucleosynthesis processes.

In this talk, I will provide an overview of the most 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. I will further discuss recent progress in exploring the underlying nuclear structure of resonances from PSF measurements, focusing on the scissor's mode and the low-energy enhancement, whose mechanisms are still not fully understood.

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