

**The radiative decay width measurement of the  $\eta$ -meson at GlueX.** IGAL JAEGLÉ, on behalf of the GlueX Collaboration, Thomas Jefferson National Accelerator Facility — The precise measurement of the  $\eta$ -meson radiative decay width via the Primakoff process with a Helium-4 nucleus presents significant challenges. It requires a pristine beamline and a thorough understanding of both the Coherent and Incoherent Nuclear contributions. Regrettably, our beamline falls short of being pristine, with 4% radiation length of materials extending from the target to the Forward Calorimeters. Our experimental resolution does not allow for the differentiation between the Coherent and Incoherent Nuclear contributions. Furthermore, both contributions cannot be calculated precisely without experimental inputs and in particular without measuring the elementary single-nucleon amplitude. Additionally, maintaining control over experimental systematics is crucial. In this presentation, we will discuss the strategies we are employing to address each challenge and achieve still a precise measurement.

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