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Status of the PrimEx-η Experiment in Hall D at Jefferson Lab[1]
ANDREW SMITH, Duke University, GLUEX COLLABORATION COLLABORATION — The $\eta \to \gamma\gamma$ decay proceeds primarily via the chiral anomaly. A precise measurement of this decay width will provide critical input to extract the η-η' mixing angles and the light quark mass ratio. Previous experimental results through e^+e^- collisions are different from the result via the Primakoff effect by more than 4σ. The PrimEx-η fixed-target experiment in Hall D at Jefferson Lab (E12-10-011[2]) will measure the $\eta \to \gamma\gamma$ decay width using the Primakoff method with a projected uncertainty of 3.2%. This would be the most precise measurement of the decay width to date, and would address the discrepancy between the results of the two types of experiments. In conjunction with the $\eta \to \gamma\gamma$ decays, the total cross section for Compton scattering from the atomic electrons inside the targets (beryllium and helium) will be measured to help control the systematic uncertainties. The first phase of the data was collected in 2019 on a liquid He-4 target, corresponding to roughly half of the total proposed statistics. This talk will discuss the physics impacts of this experiment and present some of the initial results.

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