Status of the PrimEx‑D eta radiative decay experiment in Hall D at Jefferson Lab

Dr. Tyler Hague

North Carolina A&T State University

For the PrimEx‑D and GlueX Collaborations

The PrimEx‑D collaboration at Jefferson Lab performed the first part of a new experiment in Hall D to measure the η radiative decay width with high precision using the GlueX experimental setup. In this experiment the decay will be extracted from the photoproduction of ‑meson at extreme

forward angles using the so-called Primakoff effect. The two-photon decay of the ‑meson is

predominantly undergoing due to Chiral anomaly in QCD. The projected 3% accuracy of the decay width measurement will significantly impact the -sector of the Particle Data Group’s

(PDG) compilation, sizably improving the average value on . That, in turn, will improve

determination of the rest of the partial decay widths, leading to a significant improvement in the

determination of the light quarks mass ratio in a direct and most model independent way

through the isospin violating decay channel. It will also significantly improve the mixing angle. The first part of this experiment run in spring of 2019 to test the capability of the experimental setup together with new high resolution compact electromagnetic calorimeter (CompCal) to measure the differential cross section at very forward direction. A rich and good statistics initial experimental data set was collected during this run. The collaboration is currently analyzing the data to check the experimental method and to prepare for the second full statistics run that is tentatively scheduled for the second half of 2021. The first preliminary physical distributions will be presented and discussed in this talk.