Measurement of the $t$-dependence for the Beam Asymmetry of Photoproduced $\eta$ Mesons at GlueX\textsuperscript{1} TOLGA ERBORA, JOERG REINHOLD, Florida International University, THE GLUEX COLLABORATION — We report on the photoproduction of $\eta$ mesons studied at the GlueX experiment at Thomas Jefferson National Laboratory in Newport News, VA. These particles are produced by a linearly polarized photon beam at energies between 8.2 and 8.8 GeV incident on protons in a liquid hydrogen target. Azimuthal ($\phi$) angular distributions with respect to the direction of the polarized photon facilitate the extraction of the beam asymmetry $\Sigma$ for the reaction $\gamma p \rightarrow \eta p$. $\Sigma$ is derived as a function of four-momentum transfer $-t$. Compared with previous GlueX results [1,2,3], the 2018 run period produced approximately 3-4 times more statistics, thereby allowing us to extend these measurements to values beyond the previous limitation of $-t \leq 1.1$ (GeV/c)$^2$. Preliminary results will be shown for events reconstructed from the decays of $\eta \rightarrow \pi^+\pi^-\pi^0$ and $\eta \rightarrow \gamma\gamma$. [1] S. Adhikari et al. [GlueX Collaboration], Phys. Rev. C \textbf{100}, no. 5, 052201 (2019) [2] H. Al Ghoul et al. [GlueX], Phys. Rev. C \textbf{95}, no. 4, 042201 (2017) [3] P. Collins et al. [CLAS Collaboration], Phys. Lett. B \textbf{771}, 213 (2017)

\textsuperscript{1}This work was partially supported by the U.S. Department of Energy, Office of Science, Office of Nuclear Physics under contracts DE-SC0013620 and DE-AC05-06OR23177.

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Date submitted: 25 Jun 2020

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