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Study of excited η mesons in photoproduction at CLAS

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The CLAS experiment at CEBAF at Jefferson Laboratory investigates photon scattering on the proton with high intensities. The analysis presented in this talk focuses on the reaction $\gamma p \rightarrow p\pi + \pi - \eta$ to investigate excitations of η mesons. The observed η as well as the $\eta(1295)$ and $\eta(1405)$ decay preferably to $\pi + \pi - \eta$. The main goal is to improve the present knowledge of these states. Based on SU(3) symmetry for the light mesons a singlet as well as an octet is formed. Each contains one isoscalar state which mix to the lightest pseudoscalar mesons η and η' . Thus two first radial excitations are expected, but three states were found: $\eta(1295)$, $\eta(1405)$ and $\eta(1475)$. The $\eta(1405)$ is debated to be a gluonic bound state, because it has been observed in gluon rich production mechanisms only. In this scenario the $\eta(1405)$ should have a low production cross sections in $\gamma\gamma$ fusion or photoproduction. We report on the measurement of η and $\eta(1405)$ production cross section in $\gamma p \rightarrow p\pi + \pi - \eta$.

Primary author: SOWA, Cathrina (Ruhr Universität Bochum)

Presenter: SOWA, Cathrina (Ruhr Universität Bochum)

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