

Threshold J/ψ Photoproduction with GlueX at Jefferson Lab

L.Pentchev for the GlueX collaboration

We will report the final results for the J/ψ exclusive photoproduction cross-section ($\gamma p \rightarrow J/\psi p$) from the threshold, at 8.2 GeV, up to a photon energy of 12 GeV. These measurements have a direct relation to the pentaquarks, $P_c^+(4380)$ and $P_c^+(4450)$, reported by LHCb, expected to be seen in the s -channel photoproduction $\gamma p \rightarrow P_c \rightarrow J/\psi p$. An upper limit on the $P_c(4450) \rightarrow J/\psi p$ branching fraction will be estimated. The near threshold charmonium production is also an excellent tool to study the $J/\psi p$ elastic interaction and probe the color charge distribution of the proton.

The GlueX experiment uses a tagged-photon beam produced by electrons from the 12 GeV CEBAF machine. The detector system is based on a 2 T solenoid and includes e.m. calorimeters and drift chambers providing full acceptance coverage. The J/ψ particles are registered by their decay into e^+e^- pair identified in the calorimeters. Taking advantage of the exclusivity of the reaction and the precise knowledge of the beam energy, we achieve a high mass resolution and a very low background, allowing us to perform a more sensitive unbinned analysis. Future plans for the study of threshold charmonium photoproduction will be discussed, as well.