Contribution ID: **59** Type: **not specified**

Is there really a narrow nucleon resonance at W=1700 MeV?

Thursday, 13 June 2019 15:00 (30 minutes)

The reaction $\gamma p \to p\pi^0\eta$ has been studied with the Crystal Barrel/MiniTAPS detector system at the electron stretcher accelerator ELSA in Bonn for incident photon energies from threshold up to 3.1 GeV. This work has been motivated by the recently claimed observation of a narrow structure around an excitation energy of 1678 MeV [1]. Invariant mass distributions and angular distributions of the final state particles have been analysed for the incident photon energy range E_γ = 1400 - 1600 MeV. A structure in the M(pη) mass distribution near 1700 MeV has been indeed observed, but is found to be much broader in energy. This structure has been quantitatively studied in comparison to a partial wave analysis based on previous studies of the $\gamma p \to p\pi^0\eta$ reaction. The observed excess yield with a cross section of abut 0.1 μb is tentatively attributed to a so far unobserved cascade decay of the N(1900)$3/2^+$ resonance which decays via π^0 emission to the N(1710)$1/2^+$ resonance with subsequent η decay to the nucleon ground state. This interpretation needs to be confirmed in an updated partial wave analysis.
[1] V. Kuznetsov *et al.*, *JETP Letters* **106** (2017) 693

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Session Classification: Parallel Session B

Track Classification: Baryon spectrum through meson photoproduction