Contribution ID: **101** Type: **not specified**

Results on $\pi^+\pi^-$ photoproduction on the nucleon

Tuesday, 18 October 2022 15:40 (20 minutes)

The exclusive double pion electromagnetic production is an important tool for the study of N*and* excitations and for the search of missing baryonic resonances. As far as photoproduction is concerned, the two pion channel represents the dominant contribution to the total cross section especially in the second resonant region, therefore the formation of resonances coupling directly to the N vertex and decaying to this final state could be favored.
Several measurements of unpolarized p cross sections exist and have been reported in the past years by a few experiments (like CLAS, A2 and CB-ELSA just to mention a few); however, since several states are expected to populate the same region of the mass spectrum, and overlap due to their large widths, the extraction of their features provided by the study of cross sections only is, in general, difficult.
A different approach for their study is to resort to polarization variables, which are theoretically related to partial wave amplitudes and which have the potential to provide much more detailed information on the interference pattern among them. This can be achieved investigating data collected with both a polarized beam and a polarized target. Such polarization variables are experimentally related to asymmetries in the cross sections measured in different combinations of beam helicity and target polarization.
In the g14-CLAS experiment, run in 2011-2012, a circularly polarized photon beam, with momentum in the 0.6-2.3 GeV/c range, could be exploited, interacting on a HD polarized target, so these experimental conditions could be met. In this talk, results on beam-helicity and target-spin dependent asymmetries in the study of the π+π- final state with such data will be shown and compared to earlier results by CLAS with unpolarized target, disclosing the potential strength of this analysis approach.

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Session Classification: Parallel 2

Track Classification: Baryon spectrum through meson photoproduction and electro-production