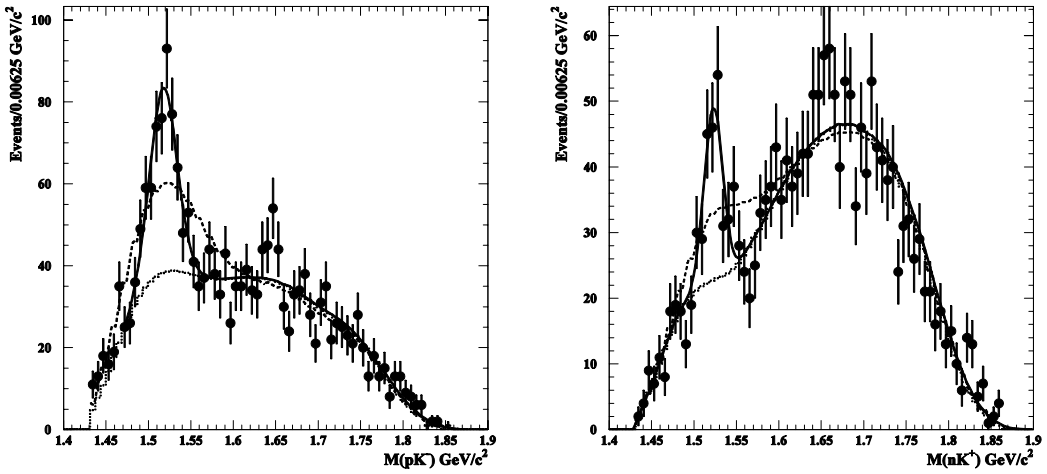
New results on the Θ^+ from LEPS

Takashi NAKANO
RCNP, Osaka University, 10-1 Mihogaoka, Ibaraki, Osaka, Japan

Since the LEPS collaboration reported a narrow baryon resonance-like structure in the nK^+ invariant mass spectrum produced in $\gamma n \to K^+K^-n$ reactions, a considerable number of experiments were carried out to check the existence of the exotic baryon, now called Θ^+. The Θ^+ is a genuine exotic baryon for which the minimum quark configuration is $uudd\bar{s}$.

In this talk I presented a study of the photo-production of the Θ^+ from a neutron by closely comparing it with the photo-production of the $\Lambda(1520)$ from a proton in a deuteron. The analysis is performed using the data collected with the LEPS detector in 2002-2003. We selected events of the type $\gamma d \to K^+K^-X$ reactions, where X denotes particles which were not required to be identified by the LEPS detector. The minimum momentum spectator approximation (MMSA) has been developed and applied to K^+K^- events in order to obtain the Fermi-motion corrected nK^+ and pK^- invariant masses. After removing ϕ contributions, The Fermi-motion corrected nK^+ invariant mass distribution showed a narrow peak at $1.524 \pm 0.002 + 0.003$ GeV/c^2. The statistical significance of the peak calculated from a shape analysis is 5.1 σ.



The details of the analysis can be seen in the e-print (arXiv:0812.1035). Future prospects at LEPS and a possible decisive experiment at J-PARC were discussed in the talk.