

Single π^0 -Photoproduction off Quasi-Free Protons and Neutrons

Manuel Dieterle^(a)

^(a) Department of Physics, University of Basel

Meson photoproduction allows a detailed investigation of the excitation spectrum of the nucleon and of the interactions of mesons with nucleons and nuclei. In order to understand the isospin decomposition of the electromagnetic excitations, it is necessary to measure the reaction not only on the proton, but also on the neutron. Since there exists no free neutron target, the sole experimental possibility to investigate this subject is the quasi-free photoproduction of mesons off neutrons bound in nuclei, in particular in the deuteron. As a consequence the production cross section will of course be influenced by nuclear Fermi motion and possibly also by nuclear final state interaction effects (FSI). However, such effects can be studied by a comparison of the free proton cross section to the quasi-free cross section measured in coincidence with recoil protons.

We will report preliminary results of a high statistics measurement of single π^0 - photoproduction off quasi-free protons and neutrons from the deuteron with the Crystal-Ball/TAPS setup at the MAMI electron accelerator facility in Mainz. Preliminary differential and total cross sections covering the full angular range and photon energies up to the second and third resonance region have been measured to point out the possible significance of FSI effects of order of 25% of magnitude.

E-mail: manuel.dieterle@unibas.ch