NUCLEAR PHOTOABSORPTION AT PHOTON ENERGIES BETWEEN 300 AND 850 MEV

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The formula derived by using the projection method for the photonuclear total absorption cross section has been presented. Our method is very effective for the case that the interference effect in the photoabsorption off a nucleon such as two-pion productions is strong.

The disappearance of the peak around the position of the D_{13} resonance in the nuclear photoabsorption can be explained by taking into account the cooperative effect of the interference in the two-pion photoproduction processes,the collision broadening of Δ and N^*,and the pion distortion in the nuclear medium. The change of the interference by the medium plays an important role. The mass shift and collision width of N^* are found to be $\delta M_{N^*} = 12$ MeV and $\Gamma_{N^*sp} = 48$ MeV,respectively. The collision width obtained is about 6 times smaller than those obtained Alberico et al or Kondratyuk et al. The total absorption cross sections in our theoretical calculation around 320 MeV are about 5 percent smaller than average experimental cross sections for several nuclei. Furthermore,theoretical total absorption cross sections in the valley region between 380 and 500 MeV are about 15 percent smaller than the average experimental cross sections. In this energy region it may be necessary to take into account reaction processes involving two nucleons explicitly.

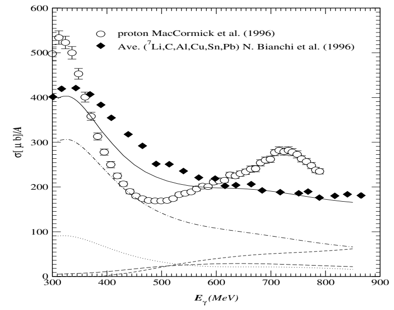

Figure 1: The total nuclear photoabsorption cross section on nuclei. The thick solid line is the full calculation. The dash-dotteded and dashed lines are the contributions of the one-pion and two-pion production, respectively. The dotted line is the contribution for the processes of N^* production and Δ production. The long dashed line is the contribution for the process of Δ and π production. The open circles represent data of the total photoabsorption cross section on a proton