Triton Two-Body Photo Disintegration with Δ-Isobar Excitation

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Nucleon-deuteron radiative capture and electron scattering from the trinucleon system are described in Ref.[1]; the work includes final state interaction, meson exchange current and Δ-isobar excitation; preliminary results were given there. In this contribution the same description is applied to the two-body photo disintegration of the triton.

The AGS equations are solved as in Ref.[2] for the trinucleon bound state and for the nucleon-deuteron scattering states. The calculations are based on a coupled-channel two-baryon potential which allows for single Δ-isobar excitation. The employed current, required for the photo disintegration matrix element, couples nucleon states and states with a Δ-isobar. It includes one-baryon and two-baryon contributions and is expanded into multipoles. In addition to the Siegert operator, the contributions from meson exchange are explicitly calculated. Electric and magnetic multipoles up to $E2$ and $M2$ are taken into account. The convergence of the results with respect to the used multipole expansion is checked.

In Fig.1 we show the differential cross section at 90° for the triton two-body photo disintegration, calculated with Δ-isobar contribution (solid line) and without (dashed line). The contribution of the Δ-isobar is determined by comparing the result based on the coupled-channel two-baryon potential to the one derived from the purely nucleonic reference potential [2]. The observed shift of the peak is in part an indirect Δ-isobar effect: The triton binding energy gets increased and the cross section changes due to scaling.

1. L. P. Yuan, K. Chmielewski, M. Oelsner, P. U. Sauer, A. C. Fonseca and J. Adam Jr., Proceedings of XVIIth European Conference on Few-Body Problems in Physics, Nucl. Phys. **A**
2. S. Nemoto, K. Chmielewski, J. Haidenbauer, S. Oryu, P. U. Sauer and N. W. Schellingerhout, Few-Body Systems **24**, 213 (1998)