The Two-Nucleon System in the Δ-Resonance Region including full Meson Retardation

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The basic motivation for the incorporation of meson retardation in the theoretical description of hadronic and electromagnetic reactions on the two-nucleon system is the failure of conventional static approaches in describing deuteron photodisintegration in the Δ-resonance region [1].

Therefore, a model for hadronic and electromagnetic reactions on the two-nucleon system has been developed [2, 3, 4] which is based on *retarded* interactions and currents and which can be applied to any reaction on the two-nucleon system for excitation energies up to about 500 MeV in which not more than one pion is produced or absorbed. It is based on meson, nucleon and Δ-degrees of freedom where for technical reasons maximal one meson is allowed to be present explicitly.

The results of this approach for NN-scattering as well as the electromagnetic breakup of the deuteron are discussed. Moreover, we consider the role of two-body contributions (MEC and hadronic backscattering) for the GDH-sum rule on the deuteron in the Δ-region.

References

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