

Antinucleon-nucleon interaction in chiral effective field theory

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Results of a study of the antinucleon-nucleon interaction within chiral effective field theory are presented. This novel approach suggested by Weinberg has been applied rather successfully to the nucleon-nucleon interaction and can be adapted straightforwardly to the antinucleon-nucleon system.

So far the antinucleon-nucleon potential has been derived up to next-to-next-to-next-to-leading order in the chiral expansion.

The low-energy constants associated with the arising contact interactions are fixed by a fit to phase shifts and inelasticities provided by a recently published phase-shift analysis of antiproton-proton scattering data.

The achieved description of the antinucleon-nucleon amplitudes is excellent and of a quality comparable to the one found in case of the nucleon-nucleon interaction at the same order.

As a special application of the antinucleon-nucleon potential predictions for the electromagnetic form factors of the proton in the time-like region are presented.

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