Hadronic Contributions to New Physics Searches



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Pion-Nucleon scattering in chiral perturbation theory

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Summary

Elastic pion-nucleon scattering is analyzed in the framework of chiral perturbation theory at the full one-loop order with explicit Δ degrees of freedom. The analysis is performed in the small scale expansion within the heavy baryon and a covariant approach based on the extended on mass-shell renormalization scheme. The pertinent low-energy constants contributing to the pion-nucleon scattering amplitude are extracted from fits to experimental scattering data as well as subthreshold parameters. A novel approach to estimate the theoretical uncertainty based on the truncation of the chiral series is employed in the fitting procedure. The obtained results for the various pion-nucleon scattering observables are presented and discussed.

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Session Classification: Direct searches of Dark Matter