Note on the Impact Parameter Analysis of High Energy Proton Proton Collisions ◇

T. Renk

Following prior analysis for measured pp elastic differential cross section, the impact parameter representation in terms of profile functions is calculated from two different parametrizations on single diffractive data. The derivative of this quantity with respect to the collision energy squared s measures the growth rate of the reaction's blackness. Its distribution in impact parameter space allows detailed insight into the growth pattern of the total cross section and the approaching unitarity limit. Comparing the results with the elastic case, the different mechanisms of unitarization of the two parametrizations are discussed.

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Aspects of Near Threshold Neutral Pion Photoproduction off Protons ◇

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We investigate near-threshold neutral pion photoproduction off protons to fourth order in heavy baryon chiral perturbation theory in the light of new data from MAMI. We show that the unitarity cusp at the secondary π^+n threshold is in agreement with expectations from the final state theorem. We also analyze the fourth order corrections to the P-wave low-energy theorems and show that potentially large Δ-isobar contributions are cancelled by sizeable pion loop effects. This solidifies the parameter-free third-order predictions, which are in excellent agreement with the data.

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The ω Meson at High Temperatures ◇

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The decays of the ω meson in a heat bath of thermally excited pions is studied within the framework of real-time thermal field theory using an appropriate effective Lagrangian. We show that the ω meson spectrum broadens considerably at temperatures $T > 100$ MeV, primarily because of $\omega\pi \to \pi\pi$ reactions in the thermal environment.

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