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Six-point ChPT amplitude for pions and kaons

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Recently [1,2], chiral perturbation theory (ChPT) has been used to predict the finite-volume spectrum of systems of three pions via the K-matrix formalism, in agreement with existing lattice data. The formalism relates the n-particle spectrum is related to the elastic n-to-n scattering amplitude, and therefore requires a six-point amplitude as input. Furthermore, it has been found that a one-loop amplitude is necessary in order to obtain reasonable agreement with data.

With the pionic cases covered, the inclusion of kaons is a logical next step. The formalism groundwork has been laid, and solid lattice results are beginning to appear [3]. While previous six-point ChPT calculations [4,5] have explored a variety of chiral symmetry breaking patterns, they have employed a single meson mass, limiting their hadron spectrum applications to systems with only pions. We describe how to solve the complications caused by distinct pion, kaon and η masses while retaining as much as possible of the technology used to simplify the cumbersome six-point amplitude, and present the result to one-loop order.

Secondary track

T07 - Flavour Physics and CP Violation

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