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Low-energy interactions of doubly charmed baryons and Goldstone bosons from lattice QCD

The S-wave interactions between doubly charmed baryons (Ξ_{cc}, Ω_{cc}) and Goldstone bosons ($\pi, K, \bar{K}$) are studied using lattice QCD on $N_f = 2 + 1$ CLQCD ensembles ($a = 0.07746$ fm, $M_\pi \simeq 210$ and 300 MeV). By applying Lüscher's method to the finite-volume spectra, we extract scattering lengths and effective ranges for four single-channel systems free of disconnected diagrams: $I = 1/2\ \Omega_{cc}\bar{K}$, $I = 1\ \Xi_{cc}K$, $I = 0\ \Xi_{cc}K$, and $I = 3/2\ \Xi_{cc}\pi$. These results show good agreement with baryon chiral perturbation theory.

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