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Approaching the chiral point in two-flavour lattice simulations

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We investigate the behaviour of the pion decay constant and the pion mass in two-flavour lattice QCD, with the physical and chiral points as ultimate goal. Measurements come from the ensembles generated by the CLS initiative using the $O(a)$ -improved Wilson formulation, with lattice spacing down to about 0.05 fermi and pion masses as low as 190 MeV. The applicability of $SU(2)$ chiral perturbation theory is investigated, and various functional forms, and their range of validity, are compared. Among the studied observables are also some related to a third, heavier valence quark (“strange”), which enables examination of kaon-related observables.

Primary author: LOTTINI, Stefano (D)

Presenter: LOTTINI, Stefano (D)