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Hadron-Hadron Interactions from Lattice QCD: Theory meets Experiments

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Recent progress in hadron-hadron interactions with lattice QCD simulations close to the physical pion mass opens the door for quantitative studies of the poorly understood low-energy hadron interactions with charm and strange quarks. It also allows comparison with femtoscopic studies in pp, pA, and AA collisions at RHIC (Relativistic Heavy Ion Collider at BNL) and LHC (Large Hadron Collider at CERN) as well as with the hypernuclear studies at J-PARC. After an overview of the basic theoretical concepts of the HAL QCD method for extracting hadronic interactions from lattice QCD data, interplay between theoretical and experimental studies will be presented, taking the H-dibaryon (6-quark system with uuddss component) and thetetraquark Tcc (doubly charmed 4-quark system) as examples. Ongoing program of physical point lattice QCD simulations using RIKEN's FUGAKI supercomputer will also be mentioned.

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