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Leading Isospin-Breaking Effects on the Lattice

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Isospin symmetry is an approximate symmetry of the strong interactions whose breaking is induced in Nature by the different masses and electric charges of the up and down quarks. This introduces small corrections to physical quantities of $O(1\%)$ that are crucial, however, to describe the structure of atomic matter and that nowadays cannot be neglected given the level of precision reached in the experimental measurements of some Flavour Physics observables. Given the highly non-perturbative behaviour of strong interactions at the hadronic scale, isospin-breaking corrections can be computed from first principles through QCD+QED numerical simulations on the lattice. Thanks to the increased computational power as well as to the algorithm and action improvements of the last decade, lattice calculations have made significant progresses reaching a remarkable level of precision in phenomenological analyses. In this talk I will show recent results on the determination of isospin-breaking effects for some hadronic observables at the state of art of lattice computations in the Flavour sector.

Primary author: GIUSTI, Davide (ROMA3)

Presenter: GIUSTI, Davide (ROMA3)

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