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Inclusion of isospin breaking effects in lattice simulations

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Isospin symmetry is explicitly broken in the Standard Model by the mass and electric charge of the up and down quarks. These effects represent a perturbation of hadronic amplitudes at the percent level. Although these contributions are small, they play a crucial role in hadronic and nuclear physics. Moreover, as lattice computations are becoming increasingly precise, it is becoming more and more important to include these effects in numerical simulations. We summarize here how to properly define QCD and QED on a finite and discrete space-time so that isospin corrections to hadronic observables can be computed ab-initio and we review the main results on the isospin corrections to the hadron spectrum. We mainly focus on the recent work going beyond the electro-quenched approximation.

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