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Charge radii and higher electromagnetic moments with lattice QCD in nonuniform background fields

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Nonuniform background electromagnetic fields, once implemented in lattice QCD calculations of hadronic systems, provide a means to constrain a large class of electromagnetic properties, from higher electromagnetic moments and charge radii to electromagnetic form factors. In this talk, I present the recent theoretical developments in realizing general background fields in periodic hypercubic lattices, along with a numerical illustration of the formalism. Additionally, I will briefly explain the formal procedure that allows the extraction of the charge radius and the quadruple moment of hadrons and light nuclei by matching an appropriate effective hadronic theory to lattice QCD correlation functions in a linearly varying electric field in space.

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