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Symmetries and Interactions from Lattice QCD

Wednesday, 30 May 2018 10:45 (35 minutes)

QCD has been long accepted as the underlying theory behind nuclear forces. However, calculations of nuclear properties directly from QCD have only very recently become mature. The theory's non-perturbative nature at low energies requires the use of lattice regularization (lattice QCD) combined with numerical methods for its solution. With these tools in hand, we are now starting to be able to predict properties of nucleons and their interactions with fully controlled and quantifiable systematics. In addition to giving us unique theoretical insight into the structure of nuclei, these techniques will allow us, for example, to inform the design and construction of experiments which utilize specific nuclei for their symmetry properties, as well as pin down potential signs of new physics from experimental signals. In this talk I will present recent results from the CalLat collaboration relevant for nuclear physics, including a calculation of the nucleon axial charge to 1% precision, as well as quantities relevant for neutrinoless double beta decay searches.

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