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Electric polarizability of neutral hadrons from dynamical lattice QCD ensembles

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Knowledge of the electric polarizability is crucial to understand the interactions of hadrons with electromagnetic fields. The neutron polarizability is very sensitive to the quark mass and is expected to diverge in the chiral limit. Here we present results for the electric polarizability of the neutron, neutral pion, and neutral kaon on eight ensembles with nHYP-smeared clover dynamical fermions with two different pion masses (227 and 306 MeV). These are currently the lightest pion masses used in polarizability studies. For each pion mass we compute the polarizability at four different volumes and perform an infinite volume extrapolation for the three hadrons. Along with the infinite volume extrapolation we conduct a chiral extrapolation for the kaon polarizability to the physical point. We compare our results for the neutron polarizability to predictions from chiral perturbation theory.

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