Abstract Submitted
for the APR15 Meeting of
The American Physical Society

Hadron electric polarizability from lattice QCD ANDREI ALEXANDRU, MICHAEL LUJAN, WALTER FREEMAN, FRANK LEE, The George Washington University — Electric polarizability measures the ability of the electric field to deform a particle. Experimentally, electric and magnetic polarizabilities can be measured in Compton scattering experiments. To compute these quantities theoretically we need to understand the internal structure of the scatterer and the dynamics of its constituents. For hadrons - bound stated of quarks and gluons - this is a very difficult problem. Lattice QCD can be used to compute the polarizabilities directly in terms of quark and gluons degrees of freedom. In this talk we focus on the neutron. We present results for the electric polarizability for two different quark masses, light enough to connect to chiral perturbation theory. These are currently the lightest quark masses used in lattice QCD polarizability studies. For each pion mass we compute the polarizability at four different volumes and perform an infinite volume extrapolation. For one ensemble, we also discuss the effect of turning on the coupling between the background field and the sea quarks. We compare our results to chiral perturbation theory expectations.

Andrei Alexandru
The George Washington University

Date submitted: 08 Jan 2015 Electronic form version 1.4