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Hadron electric polarizability from lattice QCD[1]

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Electromagnetic polarizabilities are important parameters for hadron structure, describing the response of the charge and current distributions inside the hadron to an external electromagnetic field. For most hadrons these quantities are poorly constrained experimentally since they can only be measured indirectly. Lattice QCD can be used to compute these quantities directly in terms of quark and gluons degrees of freedom, using the background field method. We present results for the neutron electric polarizability for two different quark masses, light enough to connect to chiral perturbation theory. These are currently the lightest quark masses used in polarizability studies. For each pion mass we compute the polarizability at four different volumes and perform an infinite volume extrapolation. We also discuss the effect of turning on the coupling between the background field and the sea quarks.