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Nuclear Polarization Corrections to the Lamb Shift in Muonic Deuterium[1] SAMUEL EMMONS, LUCAS PLATTER, Univ of Tennessee, Knoxville — As an electron or muon orbits a nucleus, it can excite the nucleus, and these excited nuclear states in turn affect the atomic states of the lepton-nucleus system. The resulting nuclear polarization corrections to the Lamb shift can be large and difficult to calculate accurately. We calculate these corrections in muonic deuterium in order to address their important impact on the measured finite size of the deuteron, which is relevant to the proton radius puzzle and a range of measurements taken at institutions such as the Paul Scherrer Institute. To approach the problem, we utilize pionless effective field theory and include relativistic and higher order finite range corrections. Muonic deuterium lends itself well to this approach because the muon wave function does not change much across the physical extent of the nucleus and is approximately free. This enables us to calculate the polarization correction to the Lamb shift using the forward virtual Compton amplitude, which then allows us to address the finite radius of the deuteron ground state.

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