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Nuclear polarization and the Lamb shift in muonic deuterium SAMUEL EMMONS, Carson-Newman University, CHEN JI, Central China Normal University, LUCAS PLATTER, University of Tennessee — For atoms such as electronic or muonic hydrogen or deuterium, the spectroscopic measurement of the 2S-2P Lamb shift is a good path to arrive at an estimate of a finite nuclear size. However, in such a measurement, three different quantities make contributions, and experiments cannot untangle them from each other. The three contributions to the Lamb shift come from the effects of QED, the finite size of the nucleus, and two-photon-exchange (TPE) between the orbiting lepton and the nucleus. If one desires to know the finite mean-square charge radius, theoretical calculations of the QED and TPE contributions must be made, and the precision with which one knows the radius from the Lamb shift calculation will be limited by uncertainties in these other calculations. The QED contributions to the Lamb shift are known very precisely. Calculations of the TPE part of the Lamb shift have been made for several light nuclei, including muonic deuterium. We present the preliminary results of a new calculation of the portion of the TPE correction coming from the polarization of the nucleus in muonic deuterium. We utilize pionless effective field theory (EFT) in this effort, which has the promise of providing a systematic way of reducing error in the TPE shift estimate.

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