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Lattice study of quark distribution amplitudes in the pion and its excitations EKATERINA MASTROPAS, College of William and Mary, Williamsburg VA, DAVID RICHARDS, Jefferson Lab, Newport News VA — Lattice QCD serves as a computational framework capable of predicting the spectrum of hadronic excitations from first principles. Our desire to describe the wealth of existing experimental data on the spectrum and to predict the outcomes of future experiments poses numerous challenges. Thus, obtaining an accurate resolution of excited states using methods of LQCD is complicated due to the faster decay of excited state correlation functions in Euclidean space in comparison with those of ground states, which we overcome through the use of anisotropic lattices with a finer temporal than spatial discretization. The aim of this project is to go beyond the spectrum to discern the structure of the states through the computation of the quark distribution amplitudes for both the ground and excited pion states on improved anisotropic lattices developed by the Hadron Spectrum Collaboration. Application of variational method allows us to extract the excited-state spectrum. When combined with undergoing parallel perturbative study of renormalization coefficients for quark bilinear operators, this work will enable us to explore the internal structure of the excited states, and to investigate the approach to a quark and gluon description of hadrons when probed at high-momentum transfers.

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