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Spectral properties of the Hubbard-Holstein model and comparison to ARPES experiments in the copper oxides BRIAN MORITZ, University of Waterloo, ALEXANDRU MACRIDIN, EHSAN KHATAMI, University of Cincinnati, FRANCOIS VERNAY, University of Waterloo, THOMAS MAIER, Oak Ridge National Laboratory, THOMAS P. DEVEREAUX, University of Waterloo, MARK JARRELL, University of Cincinnati — We employ a dynamical cluster Quantum Monte Carlo technique to study the two-dimensional Hubbard-Holstein model over a range of fillings, electron-phonon interaction strengths, and phonon frequencies. Previous investigations of the two-dimensional Hubbard model using these techniques have revealed many of the same features as the cuprate superconductors including strong antiferromagnetic correlations and d-wave superconductivity. We have modified the QMC algorithm to treat a continuous phonon field and take advantage of the long time scales associated with the phonon dynamics to offset the computational expense associated with sampling the relatively large configuration space. The Maximum Entropy method is employed to calculate the real frequency spectrum which we compare and contrast with recent angle-resolved photoemission (ARPES) experiments. We discuss qualitative and quantitative results in the context of features that seem to be universal to the copper oxides.

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