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**Numerical study of the isotope effect of underdoped high-temperature superconductors** ANDREI MISHCHENKO, CREST, JST, NAOTO NAGAOSA, CREST, The University of Tokyo, RRC KURCHATOV INSTITUTE TEAM, CERC, AIST TEAM, ERATO-SSH TEAM — We present a numerical study of the isotope effect on the angle resolved photoemission spectra (ARPES) in the undoped cuprates. By the systematic-error-free Diagrammatic Monte Carlo method, the Lehman spectral function of a single hole in the  $tt't'' - J$  model in the regime of intermediate and strong couplings to optical phonons is calculated for normal and isotope substituted systems. We found that the isotope effect is strongly energy-momentum dependent, and is anomalously enhanced in the intermediate coupling regime while it approaches to that of the localized hole model in the strong coupling regime. We predict the strengths of effect as well as the fine details of the ARPES lineshape change. Implications to the doped case are also discussed.

Andrei Mishchenko  
CREST, JST, Japan

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