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Momentum-Structure of Remnant Mott-gap in Prototype Doped Cuprates YINWAN LI, ZAHID HASAN, DONG QIAN, Department of Physics, Princeton University, YI-DE CHUANG, Advanced Light Source, Lawrence Berkeley National Lab., H. KISAKI, AIST, 1-1-1 Central 2, Umezono, Tsukuba, Ibaraki, Japan, S. UCHIDA, Department of Physics, University of Tokyo, Tokyo, Japan, Y. KAGA, T. SASAGAWA, H. TAKAGI, Department of Advancec Materials Science, University of Tokyo, Kashiwanoha, Chiba, Japan — Momentum dependence of charge excitation of 2-D prototype cuprate classes $La_{2-x}Sr_xCuO_4$ and $Nd_{2-x}Ce_xCuO_4$ with different doping levels (x) is measured using high resolution resonant inelastic X-ray scattering. Although a low-energy continuum is built up with doping, a remnant excitation gap behavior continues to exist even in highly doped metallic phases which we have studied in some detail. The excitation of the Mott gap becomes less dispersive asymmetrically with the increase of doping level and suggests a many-body coupling between charge fluctuation and magnetic order of the lattice. The results can be qualitatively described within the framework of t-t′-t″-U model.

Yinwan Li
Department of Physics, Princeton University

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