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Unusual photoemission resonances of oxygen-dopant induced states in $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+x}$ P. RICHARD, Z.-H. PAN, M. NEUPANE, Z. WANG, H. DING, Department of Physics, Boston College, Chestnut Hill, MA 02467, A. V. FEDOROV, Advanced Light Source, Lawrence Berkeley National Laboratory, Berkeley, CA 94720, T. VALLA, P. D. JONHSON, G. D. GU, Physics Department, Brookhaven National Laboratory, Upton, NY 11973 — A rising interest for the doping impurities in cuprates have been stimulated by a recent STM report on $\text{Bi}_2\text{Sr}_2\text{Ca}_1\text{Cu}_2\text{O}_{8+x}$ [McElroy *et al.*, *Science* **309**, 1048 (2005)], which identified oxygen dopants and investigated their local influence on the CuO_2 plane electronic properties. The nature of the perturbation induced by the dopants, which is of crucial importance, is thus questioned by these results. In order to investigate further this issue, we have performed an angular-resolved photoemission study of underdoped, optimally doped and overdoped $\text{Bi}_2\text{Sr}_2\text{Ca}_1\text{Cu}_2\text{O}_{8+x}$ samples using a wide photon energy range (14 - 100 eV). We report the presence of a non-dispersive peak, which we assign to a local impurity state similar to the one observed by STM and attributed to oxygen dopants. Unusual resonances in the peak intensity are observed around 50 and 75 eV for both the nodal and anti-nodal orientations, which suggest a hybridization of the local state with in-plane Cu.

Pierre Richard
Department of Physics, Boston College, Chestnut Hill, MA

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