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Melting of the Mott state in electron-doped iridates KOEN M BASTIAANS, IRENE BATTISTI, VITALY FEDOSEEV, Leiden University, ALBERTO DE LA TORRE, California Institute of Technology, NIKOS ILIOPOULOS, Leiden University, ANNA TAMAI, Univ of Geneva, EMILY C HUNTER, Univ of Edinburgh, ROBIN S PERRY, University College London, JAN ZAANEN, Leiden University, FELIX BAUMBERGER, Univ of Geneva, MILAN P ALLAN, Leiden University — High temperature superconductivity as it manifests in the cuprates was for long time suspected to be strongly related to the copper oxide layers, and therefore specific to only this family of materials. Here, we investigate the iridate $(Sr_{1-x}La_x)_2IrO_4$, belonging to a new class of quasi-2D effective Mott insulators [1], which we have shown to exhibit phenomena strikingly similar to the cuprates [2-4]. We focus here on the very low doping region of the phase diagram (x<4%) and use spectroscopic-imaging scanning tunneling microscopy to visualize the electronic structure at different doping concentrations. We measure fully gapped spectra even at the precise location of dopant atoms that are visible in the topograph. This is evidence for an impurity band Mott transition of the extra carriers, and that they are more deeply trapped than in the cuprates. Only at a certain doping threshold, the gap collapses revealing complex charge arrangements. [1] Kim, B. J., et al. PRL 101.7(2008):076402. [2] Kim, Y. K., et al. Nature Physics 12.1(2016):37-41. [3] De La Torre, A., et al. PRL 115.17(2015):176402. [4] Battisti, I., Bastiaans,K.M., et al. Nature Physics AOP

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