Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Charge ordering and Fermi-arc instability in underdoped cuprates RICCARDO COMIN, GEORGE SAWATZKY, ANDREA DAMASCELLI, University of British Columbia, Vancouver, Canada, ALEX FRANO, BERNHARD KEIMER, Max-Planck Institut, Stuttgart, Germany, MICHAEL YEE, JENNIFER HOFFMAN, Harvard University, Cambridge, USA, ENRICO SCHIERLE, EUGEN WESHCKE, BESSY, Berlin, Germany, RONNY SUTARTO, FEIZHOU HE, CLS, Saskatoon, Canada, YOSHIYUKI YOSHIDA, HIROSHI EISAKI, AIST, Tsukuba, Japan — The underdoped cuprate pseudogap, and related "Fermi-arc" phenomenology, is one of the most remarkable phenomena in strongly correlated-electron systems. Despite evidence for various forms of electronic instabilities, a direct link to an underlying ordered phase is still mysterious. Here we report a combined investigation of one single cuprate family by real- and momentum-space, and surface and bulk probes - resonant X-ray scattering (REXS), scanning-tunnelling microscopy (STM), and angle-resolved photoemission spectroscopy (ARPES)–which individually had a profound impact on the understanding of high-Tc cuprate superconductors, but have so-far been analyzed and interpreted within different phenomenological frameworks–and never for the very same compound. By bringing together these techniques, and with the aid of calculations of the electronic response, we establish a precise, quantitative correspondence between the Fermi arc phenomenon seen in ARPES and charge ordering as observed by REXS and STM. These converging findings suggest the existence of a universal charge-ordered state in underdoped cuprates and reveal its connection to the pseudogap phase and related fermiology.

Riccardo Comin
University of British Columbia, Vancouver, Canada

Date submitted: 08 Nov 2013 Electronic form version 1.4