

ARPES evidence of translational symmetry breaking in superconducting Fe(Te_{1-x}Sex)

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L. Moreschini[1], P.-H. Lin[2,3], A. Bostwick[1], E. Rotenberg[1], E. Giannini[4], R.Viennois[4], K.W. Yeh[5], M.K. Wu[5], and M. Grioni[2]

1 Advanced Light Source, LBNL, Berkeley, CA 94720 (USA)

2 Institute of Condensed Matter Physics, EPFL, CH-1015 Lausanne (Switzerland)

3 LPS, Université de Paris-sud, F-91140 Orsay (France)

4 DPMC, Université de Genève, CH-1211 Genève (Switzerland)

5 Institute of Physics, Academia Sinica, Nankang, Taipei, Taiwan

In systems with coexisting translational periodicities, the momentum distribution of the ARPES spectral weight $A(k,\omega)$ encodes the strength of the underlying potentials [1,2]. We have performed an unusually broad survey of k -space in superconducting Fe(Te_{1-x}Sex) samples, covering several Brillouin zones. We find that $A(k,\omega)$ does not exhibit the overall periodicity of the crystal, with a unit cell (Fe₂) containing two formula units. $A(k,\omega)$ follows instead the periodicity of the Fe layer, with a smaller and rotated (Fe₁) unit cell. This result demonstrates that translational symmetry is broken in the “11” phase, most likely by a modulation of the positions of the chalcogen atoms.

[1] J. Voit et al., Science 290, 501 (2000).

[2] C.-H. Lin et al., Phys. Rev. Lett. 107, 257001 (2011).

Primary author: LIN, P.-H. (ICMP-EPFL)

Presenters: GRIONI, Marco; LIN, P.-H. (ICMP-EPFL)

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