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【124】Acoustic plasmon excitation and its doping dependence in superconducting Bi2Sr2CaCu2O8+x

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Cuprates superconductors undergo various charge states as electron or hole carries doping into the parent charge-transfer insulators. The characters of charge dynamics are thus of great importance to understand the underlying physics behind the complex phase diagram. Using O K-edge resonate inelastic X-ray scattering, we studied the low-energy charge excitations in hole-doped superconducting Bi2Sr2CaCu2O8+x and their evolution with doping in three representative doping levels. A steep dispersive excitation is unveiled, which much resembles the acoustic plasmon observed in electron-doped cuprates. While the dispersion gets only slightly steeper as doping increases, its intensity increases considerably. Our results confirm the presence of the acoustic plasmon excitation in the double-layered Bi2Sr2CaCu2O8+x.

Primary authors: GIANNINI, Enrico (University of Geneva); PARIS, Eugenio (PSI - Paul Scherrer Institut); ASMARA, Teguh (Paul Scherrer Institut); ZHANG, Wenliang (PSI - Paul Scherrer Institut); SCHMITT, Thorsten (Swiss Light Source, Paul Scherrer Institut); TSENG, Yi (Paul Scherrer Institut)

Presenter: ZHANG, Wenliang (PSI - Paul Scherrer Institut)

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