



Physics of Josephson Plasma in High- T_c Copper Oxides

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Abstract

In the normal state of high- T_c copper oxides (cuprates), the charge transport in the interlayer c -axis direction is highly incoherent. Below T_c the c -axis transport becomes coherent, because Cooper pairs formed within each CuO_2 layer can tunnel between layers via Josephson coupling. Associated with the establishment of the interlayer phase coherence of the superconducting order parameter, collective phase fluctuation modes, called Josephson plasma modes, appear in the THz frequency range of optical spectrum. The Josephson plasma modes are used as an experimental evidence of superconductivity, and tell us unique (mysterious) physics of high- T_c cuprates.

About the Speaker

Shin-ichi Uchida is a professor Emeritus at the Department of Physics, University of Tokyo, (since 2015). His research interests include: infrared optical spectroscopy, charge transport, and material synthesis of high- T_c copper oxides and iron arsenides. He published over 660 papers during 1976-2017, including 27 Nature, 12 Science, and 70 Phys. Rev. Lett. [more than 40,000 citations and h-index 100]. Prizes include the Kamerlingh Onnes Prize 2006, etc.