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What is the "glue" for high temperature superconductivity?

TONICA VALLA, Brookhaven National Laboratory

It has been 20 years since the high-temperature superconductivity (HTSC) was discovered in $La_{2-x}Ba_xCuO_4$, by Bednorz and Müller. Since then, many different HTSC compounds, all containing copper-oxide planes, were synthesized and HTSC became one of the most studied problems in science. However, the mechanism of HTSC still remains unknown. Recent advancements in Angle-Resolved Photoemission Spectroscopy (ARPES) have enabled a direct probing of effects of interactions between electrons and different bosonic excitations in a system, raising the expectations that a "pairing boson" responsible for HTSC could finally be identified. Here, we will present the study of single-particle excitations in two different cuprates: $Bi_2Sr_2CaCu_2O_{8+\delta}$, a high-temperature superconductor with $T_C = 91$ K and $La_{1.875}Ba_{0.125}CuO_4$, a system with suppressed superconductivity ($T_C \leq 2.5$ K) due to the spin/charge ordering. The extracted self-energies and single-particle gaps will be compared and possible coupling mechanisms will be discussed. This work was supported by the DOE under contract number DE- AC02-98CH10886.