

Abstract Submitted
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Distinguishing between spin-fluctuation and phonon-mediated d -wave superconductivity in cuprates by high-pressure Raman scattering¹
XIAOJIA CHEN, Geophysical Laboratory, Carnegie Institution of Washington, JIAN-XIN ZHU, Theoretical Division, Los Alamos National Laboratory, VIKTOR V. STRUZHKIN, ALEXANDER F. GONCHAROV, Geophysical Laboratory, Carnegie Institution of Washington, CHENG-TIAN LIN, Max-Planck-Institut für Festkörperforschung, Germany, RUSSELL J. HEMLEY, HO-KWANG MAO, Geophysical Laboratory, Carnegie Institution of Washington — Determining the nature of interaction responsible for the Cooper-pair formation in high- T_c cuprates remains one of the grand challenges in modern condensed matter physics. The most probable candidates are lattice vibrations (phonons) and spin fluctuation modes. Recently, it has been argued that Raman scattering in B_{1g} symmetry may serve as a probe to distinguish between phonon-mediated and magnetically mediated d -wave superconductivity. Here we report the results of electronic Raman scattering measurements in Bi-based bilayer and trilayer superconductors at high pressures and at temperatures around 12 K. As a clean and effective tool, pressure enhances T_c and thus increases the pairing interaction in these materials. Meanwhile, we find that pressure also brings about the change of the B_{1g} mode. The observed evolution of B_{1g} modes with pressure sheds important insight on the pairing mechanism of high- T_c superconductivity.

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