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Identification of Bosonic Mode in the Electron-Doped Superconductor $\mathbf{Pr_{0.88}LaCe_{0.12}CuO_{4-\delta}}$ SHANKAR KUNWAR, FRANCIS NIESTEMSKI, SEN ZHOU, Department of Physics, Boston College, Chestnut Hill, MA, 02467, SHILIANG LEE, University of Tennessee, Knoxville, TN, 37996, HONG DING, ZIQIANG WANG, Department of Physics, Boston College, Chestnut Hill, MA, 02467, PENGCHENG DAI, University of Tennessee, Knoxville, TN, 37996, MADHAVAN VIDYA, Department of Physics, Boston College, Chestnut Hill, MA, 02467 — It is well known that in the superconducting state, the current carriers are the cooper pairs, where two electrons (fermions) get paired up by a mediator (glue) and behave as a single boson. In conventional superconductors, lattice vibrations (phonons) act as a glue to pair up the electrons, however, in high T_c superconductors, the mechanism that binds these fermions together is sill unclear. There are two principal contenders for the glue: phonons and the spin excitations. Using high resolution STM we have probed an electron-doped superconductor, $Pr_{0.88}LaCe_{0.12}CuO_{4-\delta}$($T_c$ = 24K) and identified a bosonic excitation at 10.5 $\pm$ 2 meV which could potentially act as the superconducting glue. The energy scale of this mode rules out an explanation in terms of the oxygen optical phonons confining the possibilities to spin excitations and the acoustic phonons. This finding potentially takes us one step closer to identifying the superconducting glue in High T_c superconductors.

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