

Abstract Submitted
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Electron-Spin Excitation Coupling in an Electron Doped Copper Oxide Superconductor Pr0.88LaCe0.12CuO4- δ ¹ JUN ZHAO, Department of Physics, University of California, Berkeley, FRANCIS C. NIESTEMSKI, SHANKAR KUNWAR, Department of Physics, Boston College, SHILIANG LI, Institute of Physics, Chinese Academy of Sciences, PAUL STEFFENS, ARNO HIESS, Institut Laue Langevin, Grenoble, France, HYE JUNG KANG, NIST Center for Neutron Research, STEPHEN D. WILSON, ZIQIANG WANG, Department of Physics, Boston College, PENGCHENG DAI, Department of Physics and Astronomy, The University of Tennessee, Knoxville, VIDYA MADHAVAN, Department of Physics, Boston College — We use polarized and unpolarized inelastic neutron scattering to study the magnetic excitations of the electron doped copper oxide superconductors Pr0.88LaCe0.12CuO4- δ (PLCCO, $T_c = 21$ K, 24 K) over a wide energy range. We found the energy dependence of the imaginary part of the dynamic susceptibility displays two distinct energy scales in both samples. Interestingly, the STS measurements on the same samples reveal two modes that evolve with T_c in a similar manner as neutron modes. A comparison of the spatial and temperature dependence of the neutron and STS modes suggests that the low energy mode is associated with antiferromagnetism while the high energy mode is connected with superconductivity. These results suggest that spin excitations are the mediating glue for the electron pairing in PLCCO.

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