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Magnetic excitations in the high-temperature superconductors $\text{HgBa}_2\text{CuO}_{4+\delta}$ and $\text{Nd}_{1.845}\text{Ce}_{0.155}\text{CuO}_4$ GUICHUAN YU, YUAN LI, EUGENE MOTOYAMA, Stanford University, PHILIPPE BOURGES, Laboratoire Léon Brillouin, KLAUDIA HRADIL, RICHARD MOLE, Forschungsneutronenquelle Heinz Maier-Leibnitz, MARTIN GREVEN, Stanford University — We report inelastic neutron scattering results for the magnetic excitations in hole-doped $\text{HgBa}_2\text{CuO}_{4+\delta}$ (Hg1201) and electron-doped $\text{Nd}_{2-x}\text{Ce}_x\text{CuO}_{4+\delta}$ (NCCO). The magnetic resonance mode has been observed previously in the superconducting state of several hole-doped systems. Recently, this mode has also been claimed to be present in the electron-doped compounds. We found in underdoped Hg1201 ($T_c \sim 85$ K) the resonance-like feature appearing at rather high energy of 57(2)meV. Surprisingly, the dynamic susceptibility enhancement appears below the pseudogap temperature T^* and shows no anomaly at T_c . Unlike recent reports for optimally-doped NCCO and $(\text{Pr,La,Ce})_2\text{CuO}_{4+\delta}$, we found no evidence for a resonance mode in NCCO ($x=0.155$) in the 7-12 meV range. Instead, we identify two lower-energy features. One is associated with spectral weight redistribution below T_c due to the electronic gap 2Δ , the other already present in normal state is likely associated with the significant spin correlations in the electron-doped cuprates.

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