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Momentum-Resolved d-wave Eliashberg Calculation Using The Spin Excitation Spectrum for LSCO Superconductors SEUNG HWAN HONG, HAN-YONG CHOI, SungKyunKwan University — We solve the momentum resolved d-wave Elishberg equation employing the magnetic excitation spectrum from the inelastic neutron scattering on the LSCO superconductors reported by Vignolle et al. [1]. The magnetic excitation spectrum exhibits 2 peaks: a sharp incommensurate peak at 18 meV at momentum $(\pi, \pi \pm \delta)$ and $(\pi \pm \delta, \pi)$, and another broad peak near 40$\sim$70 meV at momentum (π, π). Above 70 meV, the magnetic excitation spectrum has a long tail that is shaped into a circle centered at (π, π) with δ'. The sign of the real part of the total self-energy $\Sigma(\vec{k}, \omega) + X(\vec{k}, \omega)$ is determined by the momentum position of the peaks of the magnetic excitation spectrum and bare dispersion $\xi(\vec{k})$. We will discuss the effects of the each component of the magnetic excitation spectrum on the self-energy $\Sigma(\vec{k}, \omega)$ the renormalization of the band dispersion $X(\vec{k}, \omega)$, the pairing function $\phi(\vec{k}, \omega)$, and the spectral function $A(\vec{k}, \omega)$.

[1] B.Vignolle et.al., Nature Physics 3,163-167 (2007)

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