

Doping dependence of spin dynamics in bilayer cuprate superconductors

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Within the framework of kinetic energy driven superconductivity,¹ we have studied the spin dynamics of bilayer cuprate superconductors in the superconducting state over a wide doping range. It is shown that the dynamical spin structure factor is split into two non-degenerate modes, odd and even, due to the inter-layer magnetic interaction in a bilayer unit. The doping dependence of the resonant energy of the odd channel forms a dome-like shape while the resonant energy of the even channel decreases for increasing the doping level. Our results are in agreement with inelastic neutron scattering experimental results.²

¹Shiping Feng, Phys. Rev. B **68**, 184501 (2003).

²S. Pailhès, C. Ulrich, B. Fauqué, V. Hinkov, Y. Sidis, A. Ivanov, C. T. Lin, B. Keimer, and P. Bourges, Phys. Rev. Lett. **96**, 257001 (2006); L. Capogna, B. Fauqué, Y. Sidis, C. Ulrich, P. Bourges, S. Pailhès, A. Ivanov, J. L. Tallon, B. Liang, C. T. Lin, A. I. Rykov, and B. Keimer, Phys. Rev. B **75**, 060502(R) (2007).