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Nodal quasiparticle in pseudogapped colossal magnetoresistive manganites N. MANNELLA, W. L. YANG, X. J. ZHOU, K. TANAKA, H. ZHENG, J. F. MITCHELL, J. ZAANEN, T. P. DEVEREAUX, N. NAGAOSA, Z. HUSSAIN, Z. X. SHEN — In this talk, the result of a recent angle-resolved photoemission spectroscopy (ARPES) investigation which allowed elucidating the controversial nature of the ferromagnetic metallic groundstate in the prototypical colossal magnetoresistive manganite bilayer compound $La_{1.2}Sr_{1.8}Mn_2O_7$ will be discussed [1]. The distribution of spectral weight in momentum space exhibits a nodal–antinodal dichotomous character. Quasiparticle excitations have been detected for the first time along the nodal direction (i.e. diagonal), and they are found to determine the metallic transport properties of this compound. The weight of the quasiparticle peak diminishes rapidly while crossing over to the antinodal (i.e. parallel to the Mn–O bonds) parallel sections of the Fermi surface, with the spectra strongly resembling those found in heavily underdoped cuprates high temperature superconductors (HTSC) such as $Ca_{2-x}Na_xCuO_2Cl_2$ [2]. This dichotomy between the electronic excitations along the nodal and antinodal directions in momentum space was so far considered a characteristic unique feature of the copper oxide HTSC. These findings therefore cast doubt on the assumption that the pseudogap state in the cuprate HTSC and the nodal-antinodal dichotomy are hallmarks of the superconductivity state. [1] N. Mannella et al., Nature 438, 474 (2005) [2] K. M Shen et al., Science 307, 901 (2005).

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