

## Occurrence of Fermi Pockets without the Pseudogap Hypothesis and Clarification of ARPES Spectra in Underdoped Cuprates

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Central issues in the electronic structure of underdoped cuprates is to clarify the shape of Fermi surfaces and the origin of pseudogap. In this talk, based on the model proposed by Kamimura and Suwa which bears characteristics born from the interplay of Mott physics and Jahn-Teller physics [1,2], we show that the feature of Fermi surfaces is the Fermi pockets constructed by doped holes under the coexistence of a metallic state and the local AF order. This feature is consistent with recent ARPES experiments by Meng et al [3]. Calculated ARPES spectra below  $T_c$  consist of a coherent peak due to the d-wave superconducting density of states at the nodal region and the real transitions of photo-excited electrons from the occupied states below the Fermi level to a free electron state in the antinodal region. Hole-concentration- and temperature-dependences of the latter transition energies are in a good agreement with experimental results [4, 5]. Finally the origin of  $T^*$  is discussed. [1] H. Kamimura and Y. Suwa, J. Phys. Soc. Jpn. **62**, 3368(1993), [2] H. Kamimura, T. Hamada and H. Ushio, Phys. Rev. B **66**, 054504 (2002). [3] J. Meng, et al., Nature **462**, 335 (2009), [4] K. Tanaka, et al., Science **314**, 1910 (2006), [5] W.S. Lee et al., Nature **450**, 81 (2007).