Unusual pseudogap features observed in iron-oxypnictide superconductors

Y. ISHIDA, RIKEN SPring-8 Center, T. SHIMOJIMA, K. ISHIZAKA, T. KISS, M. OKAWA, ISSP U. Tokyo, T. TOGASHI, RIKEN SPring-8 Center, S. WATANABE, ISSP U. Tokyo, X.-Y. WANG, C.-T. CHEN, CAS, Y. KAMIHARA\(^1\), ERATO-SORST JST, in FRC, Tokyo Inst. Tech., M. HIRANO\(^2\), H. HOSONO\(^3\), Materials and Structural Lab. Tokyo Inst. Tech., S. SHIN\(^4\), ISSP U. Tokyo — Laser photoemission spectroscopy is employed to investigate the electronic structures of LaFeAsO:F and LaFePO:F \([1]\) exhibiting \(T_c = 26\) and \(5\) K, respectively \([2]\). We find that the high-\(T_c\) LaFeAsO:F exhibits a temperature-dependent pseudogap extending over \(\sim 0.1\) eV about the Fermi level at \(250\) K, whereas such a feature is absent in low-\(T_c\) LaFePO:F. We also find \(\sim 20\)-meV pseudogap features and signatures of superconducting gaps both in LaFeAsO:F and LaFePO:F. We discuss possible origin of the pseudogaps through comparison with the cuprates. \([1]\) Y. Kamihara et al., JACS 128, 10012 (2006); 130, 3296 (2008). \([2]\) Y. Ishida et al., arXiv:0805.2647.

\(^{1}\)FRC, Tokyo Inst. Tech.

\(^{2}\)ERATO-SORST JST, in FRC, Tokyo Inst. Tech.

\(^{3}\)ERATO-SORST JST, in FRC, Tokyo Inst. Tech. and FRC, Tokyo Inst. Tech.

\(^{4}\)RIKEN SPring-8 Center

Y. Ishida
RIKEN SPring-8 Center

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