Abstract for an Invited Paper
for the MAR10 Meeting of
The American Physical Society

ARPES studies of FeAs-based compounds[1]

PIERRE RICHARD, WPI-AIMR, Tohoku University

With critical temperatures and $2\Delta/k_B T_c$ ratios comparable to those of cuprates, the new iron-based superconductors are believed to be the host of an unconventional pairing mechanism. Since these superconductors are multi-band materials, a deep understanding of their electronic properties and of the paring mechanism necessitates a good knowledge of their electronic structure in momentum space, particularly in the vicinity of the Fermi level. Owing to its momentum resolution capability, angle-resolved photoemission spectroscopy (ARPES) is a very powerful tool to characterize precisely the electronic states lying close to the Fermi level, which trigger the electronic behavior of crystals. In this talk, I present recent ARPES results obtained on the so-called 122 class of materials over a wide range of doping. I show the evolution of the multi-band Fermi surface and the superconducting gap with doping and emphasize on the importance of interband scattering. In particular, I reveal that the occurence of high-temperature superconductivity seems related to "near-nesting" of Γ-centered holelike and M-centered electronlike Fermi surface pockets.

[1]This work is supported by MEXT of Japan.