

Abstract Submitted
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Angle Resolved Photoemission Spectroscopy Study of $\text{CaKFe}_4\text{As}_4$ Superconductor DAIXIANG MOU, TAI KONG, WILLIAM MEIER, Ames Laboratory, FELIX LOCHNER, Institut für Theoretische Physik III, Ruhr-Universität Bochum, LIN-LIN WANG, Iowa State University, QISHENG LIN, YUN WU, SERGEY BUD'KO, Ames Laboratory, ILYA EREMIN, Institut für Theoretische Physik III, Ruhr-Universität Bochum, DAVID JOHNSON, PAUL CANFIELD, ADAM KAMINSKI, Ames Laboratory — $\text{CaKFe}_4\text{As}_4$ is a new superconductor with high T_c of 35K at stoichiometric composition. This presents unique opportunity to study properties of iron arsenic superconductors in absence of disorder caused by doping or substitution. We use high resolution angle resolved photoemission spectroscopy and density functional theory to study the electronic properties of this new material. We find that the Fermi surface consists of three hole pockets at Γ and two electron pockets at the M point. The values of the superconducting gap are nearly isotropic, but significantly different for each of the FS sheets. The overall momentum dependence of the gap magnitudes displays a deviation from the simple $\cos(k_x)\cos(k_y)$ functional form. Instead, the maximum value of the gap is observed for FS sheets that are closest to the ideal nesting condition. Our results provide strong support for the multiband character of superconductivity in $\text{CaKFe}_4\text{As}_4$, in which Cooper pairing forms on the electron and the hole bands interacting via dominant interband repulsive interaction, enhanced by FS nesting.

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