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## Dramatic variation of electronic structure with doping in iron arsenic superconductors revealed by angle resolved photoemission spectroscopy TAKESHI KONDO

The characteristic feature of the phase diagram of iron pnictides is coexistence and competition of the magnetic order and superconductivity in certain doping range. The interplay between magnetism and superconductivity appears to be central issue in understanding properties of these materials. Presence of the two orders has pronounced effects on the electronic structure, which is here used to elucidate their intriguing relation which then can be studied with angle resolved photoemission spectroscopy (ARPES). We have collected extensive sets of data on CaFe<sub>2</sub>As<sub>2</sub> and BaFe<sub>2</sub>As<sub>2</sub>, two types of parent compounds as well as Co-doped BaFe<sub>2</sub>As<sub>2</sub> for a wide range of carrier concentration. The data of parent compounds demonstrates that although inner most Fermi surface sheet is strongly three-dimensional, it does indeed have long parallel segments along the  $k_z$  direction that can lead to the emergence of magnetic order via  $(\pi, \pi)$  nesting. More interestingly, we find very unusual incommensurate nesting of the Fermi surface in the a - b plane that is present only at low temperatures. We speculate that this may be a signature of a failed Charge Density Wave (CDW) state that was predicted by renormalization group studies. Data from Co-doped BaFe<sub>2</sub>As<sub>2</sub> samples is particularly intriguing. We found that the signature of Fermi surface reconstraction due to the antiferromagnetic ordering vanishes at the doping corresponding to the onset of the superconductivity, rather than point where the sample becomes paramagnetic. This is consistent with an abrupt change with doping of a value of hole coefficient, which is sensitive to a topology of Fermi surface. Our finding clearly demonstrates that avoiding magnetically driven, significant Fermi surface reconstruction is a key to establishing the superconductivity in iorn arsenic superconductors.