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Interplay of superconductivity with the SDW order and Eu^{2+} AFM order in the $Ca_{1-x}Eu_xFe_2As_2$ system at ambient and under pressures[1] KESHAV SHRESTHA, KUI ZHAO, BEN JAWDAT, LIANGZI DENG, XIYU ZHU, YUYI XUE, BING LV, Texas Center for Superconductivity and Department of Physics, University of Houston, Houston, TX 77204-5002, PAUL CHU, Texas Center for Superconductivity and Department of Physics, University of Houston, Houston, TX 77204-5002 & Lawrence Berkeley National Laboratory — Single crystals of Eu doped $Ca_{1-x}Eu_xFe_2As_2$ ($0 \leq x \leq 1$) with size up to 5 x 5 mm size were grown from FeAs self-flux technique. Detailed magnetic and resistivity data a systematical evolution of a spin-density-wave (SDW) transition from $\sim$ 170K at x=0 to $\sim$ 190K at x =1. Moreover, the Eu^{2+} antiferromagnetic (AFM) emerged at 3.7K at a threshold doping x $\sim$ 0.2, and systematically increased up to $\sim$ 20K with the increase of the Eu content. High pressure was applied to some of these compounds to explore the competition among SDW, collapsed phase and superconductivity. Superconductivity up to 18K was observed in samples without the structural "collapsed tetragonal" phase before the emergence of the superconductivity signal. The data suggest that the superconductivity in the doped Ca122 under pressure is not associated with the structural collapsed-tetragonal phase. The complex phase diagram of the SDW, Eu^{2+} AFM order and superconductivity at ambient and under pressure will be presented and its implication will be discussed.

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Keshav Shrestha
Texas Center for Superconductivity and Department of Physics,
University of Houston, Houston, TX 77204-5002

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