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Nernst effect of iron pnictide and stripe ordering cuprate superconductors [1]

Christian Hess[1], Agnieszka Kondrat[1], Emad M. Ahmed[1], Günter Behr[1], Bernd Büchner[1], Udo Ammerahl[2], Alexandre Revcolevschi[2]

[1] *Institute for Solid State Research, IFW-Dresden, P.O. Box 270116, D-01171 Dresden, Germany*

[2] *Laboratoire de Physico-Chimie de L'Etat Solide, ICMMO, UMR8182, Université Paris-Sud, 91405 Orsay, France*

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The Nernst effect has recently proven a sensitive probe for detecting unusual normal state properties of unconventional superconductors. Here we present a systematic study of the Nernst effect of the iron pnictide superconductor $LaO_{1-x}F_xFeAs$ with a particular focus on its evolution upon doping [1]. For the parent compound we observe a huge negative Nernst coefficient in the spin density wave (SDW) ordered state. Surprisingly, an unusual and enhanced Nernst signal is also found at underdoping ($x = 0.05$) despite the presence of bulk superconductivity and the absence of static magnetic order, strongly suggestive of SDW precursors at $T \lesssim 150$ K. These precursors seem to fade at higher doping levels, since a more conventional and rather featureless normal state Nernst response is observed at optimal doping ($x = 0.1$). We compare these findings with results for the Nernst effect of the stripe ordering cuprate superconductor $La_{1.8-x}Eu_{0.2}Sr_xCuO_4$ [2]. At $x = 0.125$ and 0.15 a kink-like anomaly is present in the vicinity of the onset of charge stripe ordering temperature, consistent with an enhanced positive quasiparticle Nernst response in the stripe ordered phase. However, a direct comparison between the Nernst coefficients of stripe ordering $La_{1.8-x}Eu_{0.2}Sr_xCuO_4$ and superconducting $La_{2-x}Sr_xCuO_4$ at the doping levels $x = 0.125$ and $x = 0.15$ reveals only weak differences, i.e., the enhancement of the Nernst response due to static stripe order as compared to that of the pseudogap phase is very small.

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