Contribution ID: **58** Type: **not specified**

Magnetoresistance in electron under-doped cuprate superconductor Nd2-xCexCuO4

Wednesday, 27 May 2015 15:30 (30 minutes)

High-temperature cuprate superconductors (HTSC) are materials that become superconducting at unusually high temperatures. The interplay between antiferromagnetic (AF) and superconductivity (SC) is one of the most fascinating phenomena in the HTSC . The parent compounds of all the high-Tc cuprates are AF Mott insulators. Upon doping the antiferromagnetism vanishes and superconductivity appears together with the metallic state. In the electron-doped cuprates Ln2-xCexCuO4, where Ln=Nd, Pr, Sm, Eu , the AF order is more stable against doping than in hole-doped cuprates. So, the question now is whether the AF and SC states coexist and,if yes ,then whether this is an intrinsic phase separation or a microscopic coexistence.
In the present work we are going to investigate whether superconductivity and AF coexist in the electron - underdoped Nd2-xCexCuO4 (NCCO) for a broad doping range ($0.10 \leq x \leq 0.145$) . To the end we carry out detailed studied of out of plane MR Magnetoresistance of NCCO which provides insight into the coupling between the charge carriers and the background magnetism .The focus is laid on manifestation of spin-dependent transport characteristic of a magnetically orderd state .

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Session Classification: Student Sessions