ORIGIN OF THE ANOMALOUS LOW TEMPERATURE UPTURN IN RESISTIVITY IN THE ELECTRON-DOPED CUPRATES

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Introduction
In hole doped (p-doped) cuprates, the overdoped region is believed to be metallic (Fermi liquid-like), whereas in the underdoped region, at low temperatures the resistivity increases with decreasing temperatures and may even be logarithmically diverging at $T=0$. A similar behavior with decreasing doping is found in the electron-doped (n-doped) cuprates.

Experimental
We have investigated the origin of this low temperature upturn in resistivity using angle dependent magnetotransport measurements on the electron-doped cuprate Pr$_{2-x}$Ce$_x$CuO$_4$ (PCCO).

Results and Discussion
We performed these measurements in fields of up to 32 tesla during the week of January 19, 2004 (Fig. 1). We used the resistive magnet in cell 9 and the rotator probes for the resistivity measurements.

Conclusions
We showed that there is a correlation between the resistivity upturn and the isotropic, spin related magnetoresistance, and therefore, we suggest that the upturn is a result of a spin effect [1]. This work has been submitted to Physical Review Letters [1].

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References