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Superconducting fluctuations and disorder in high-Tc cuprates
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The determination of critical fields and of the superconducting fluctuations in the cuprates are still highly debated questions, as both extremely high field and reduced T_c cuprates are required to attempt to reach the normal state regime. We have studied in fields up to 60T the variation of the transverse magnetoresistance (MR) of underdoped $YBCO_{6.6}$ crystals either pure or with T_c reduced down to 3.5K by electron irradiation [1]. We show that the normal state MR is restored above a threshold field $H'_c(T)$, which is found to vanish at $T'_c >> T_c$. This allows us to evidence a (H,T) range where superconductivity survives at least as fluctuations. When T_c is decreased by disorder, we found that the fluctuation range expands significantly as T'_c is slightly depressed. This T'_c behaves similarly versus defect content as the onset temperature T_ν of the Nernst signals measured on the same samples [2] which indicates that the T_c decrease is partly due to the loss of the phase coherence. We found that T'_c, $H'_c(T)$ and T_ν which can be related to pair formation are depressed, although moderately, by the introduction of defects in contrast to the pseudogap temperature which is known to be insensitive to disorder, showing that these energy scales are not related. [1] F. Rullier-Albenque et al, cond-mat 0610838
[2] F. Rullier-Albenque et al., Phys. Rev. Lett. **96**, 067002 (2006)

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