Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

**Disorder, Metal-Insulator crossover and Phase diagram in high-$T_c$ cuprates** FLORENCE RULLIER-ALBENQUE, SPEC - CEA, HENRI ALLOUL, LPS - CNRS, FEDOR BALAKIREV, NHMFL - Los Alamos, CYRIL PROUST, LNCMP - CNRS — We have studied the influence of disorder induced by electron irradiation on the normal state resistivities $\rho$(T) of optimally and underdoped $YBa_2Cu_3O_x$ single crystals, using pulsed magnetic fields up to 60T to completely restore the normal state. We evidence that point defect disorder induces low $T$ upturns of $\rho$(T) which saturate in some cases at low $T$ in large applied fields as would be expected for a Kondo-like magnetic response. Moreover the magnitude of the upturns is related to the residual resistivity, that is to the concentration of defects and/or their nanoscale morphology. These upturns are found quantitatively identical to those reported in lower $T_c$ cuprates, which establishes the importance of disorder in these supposedly pure compounds. We therefore propose a realistic phase diagram of the cuprates, including disorder, in which the superconducting state might reach the antiferromagnetic phase in the clean limit.

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Date submitted: 27 Nov 2007 Electronic form version 1.4