Thermodynamic estimation of the upper critical field slope of doped SmFeAsO from fluctuation conductivity in the critical regime
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We measure magnetotransport in SmFeAs($O_{1-x}F_x$) polycrystalline samples up to 28T and we extract the upper critical fields, using different criteria. Due to fluctuation effects, not negligible magnetoresistance and resistivity not saturating to a residual value at Tc, H_{c2} values turn out to be strongly criterion-dependent. In order to circumvent this problem, we propose a thermodynamic estimation of the upper critical field slope dH_{c2}/dT based on the analysis of conductivity fluctuations in the critical regime at high fields. Indeed, in this regime we find evidence of a two-dimensional lowest Landau level (LLL) scaling for applied fields larger than $\mu_0 H_{LLL} \sim 8T$, which allows to extract a high field slope as large as -12T/K for the optimally doped sample SmFeAs($O_{0.85}F_{0.15}$). A comparison of the fluctuation behavior with that of high-T_c cuprates indicates that this H_{LLL} value may be related to the H_{c2} and κ values higher than those of cuprates..

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