Detection of magnetism in heavily overdoped La$_{2-x}$Sr$_x$CuO$_4$ single crystals

CHRISTINA KAISER, VIGHEN PACRADOUMI, Simon Fraser University, SEYED-AHMAD SABOK-SAYER, Northern Illinois University, CHRIS COCHRANE, Queen’s University, DOUG MACLAUGHLIN, University of California, Riverside, SEIKI KOMIYA, Central Research Institute of Electric Power Industry, NIGEL HUSSEY, University of Bristol, JEFF SONIER — We have measured the DC magnetic susceptibility of a heavily overdoped La$_{1.67}$Sr$_{0.33}$CuO$_4$ single crystal. In contrast to lower-doped superconducting samples no magnetic anisotropy is observed. However, as previously seen in the normal state, there is a Curie-like term that appears in the susceptibility for strontium content in excess of $x\sim0.19$. This is true even for La$_{1.67}$Sr$_{0.33}$CuO$_4$, in which the electronic system is fairly well established to be a Fermi liquid. A tentative explanation of the DC magnetic susceptibility and complimentary MuSR measurements on the same La$_{1.67}$Sr$_{0.33}$CuO$_4$ sample is discussed in terms of recent predictions of ferromagnetism in the heavily overdoped regime.