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Investigation of the role of spin-texture on the Na0.46CoO2 J.W. KIM, E.-D. MUN, R. MCDONALD, J. THOMPSON, I. MARTIN, C. BATISTA, V. ZAPF, LANL, P. MOLL, ETH-Zurich, A. MORPURGO, University of Geneva, D. ARGYRIOU, Helmholtz-Zentrum Berlin für Materialien und Energie — We will present magnetotransport properties and their relationship to a possible chiral spin texture in ultra-thin $Na_{0.46}CoO_2$ devices in high magnetic fields. This composition exhibits a weakly insulating state, with a frustrated local spin texture, unique, among the hexagonal Na_xCoO_2 family. Previous a large large Hall effect was found for composition x=0.5 (M. Foo *et al.*, Phys. Rev. Lett. 92, 247001 (2004)) and prior high-field studies (L. Balicas *et al.*, Phys. Rev. Lett. 94, 236402 (2005).) have found the existence of a small Fermi surface in the system and a two-fold angular magnetoresistance. To date however, the Hall-conductivity has not been investigated in magnetic fields strong enough to suppress the charge-order, above 41 T. Herein, we investigate the role of local spin-texture (in the charge-ordered state) on the Hall conductance by measuring both bulk and devices with only several monolayers thick in strong magnetic fields. Our investigations under magnetic fields (B <60 T) show that the high resistivity charge-order region is suppressed with out-of-plane field at B ~41 T with highly non-monotonic -ρ_{xy} with a maximum at B ~27 T and rapidly decreases to zero. However, magnetization measurements show no significant features within measurement accuracy indicating that magnetization changes are small at the field-induced phase transition. Recent theoretical advances suggest that this compound exhibits a quantum Hall state coupled with spin chirality (I. Martin, C. D. Batista, Phys. Rev. Lett. 101, 156402 (2008)).

[X] Prefer Oral Session
[ ] Prefer Poster Session

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