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Magnetic-field-induced Fermi surface reconstruction in $Na_{0.5}CoO_2$ LUIS BALICAS, National High Magnetic Field Lab, Florida State University, MAJED ABDEL-JAWAD, NIGEL HUSSEY, Physics Department, University of Bristol UK, FANGCHENG CHOU, Center for Materials and Engineering, Massachusetts Institute of Technology, PATRICK A. LEE, Department of Physics, Massachusetts Institute of Technology — We have performed an electrical transport study in $Na_{0.5}CoO_2$ at high fields B and low temperatures T. We find that the charge ordered state observed below $T_{CO} = 53$ K can be suppressed by large in- plane magnetic fields, but not by fields applied along the inter-plane direction. For B rotating within the conductive CoO_2 layers we observe angular magnetoresistance oscillations of essentially two-fold periodicity consistent with the reported orthorhombic symmetry of $Na_{0.5}CoO_2$. As B increases however, a new 6-fold periodicity emerges indicating the stabilization of a hexagonal FS as reported by the ARPES measurements. This observation suggests on the one hand, that the Na superstructure defines the geometry of the FS at low temperatures, and on the other, that the charge order in the conducting plane is suppressed by high in-plane fields. At low temperatures Shubnikov de Haas oscillations (SdH) of very small frequencies are observed for B // c-axis, indicating that almost the entire FS reported for $x = 0.6$ and 0.7 disappears below T_{CO} for $x = 0.5$. Our results strongly indicate that the charge ordering involves the coupling with the Na order and involves the large hole pocket.

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