Strong current dependence of resistivity in CaMnO$_3$:\textsuperscript{1} CORNELIU CHIORESCU, University of Miami, JOHN NEUMEIER, Montana State University, JOSHUA COHN, University of Miami — The perovskite manganite CaMnO$_3$ (CMO) has a G-type antiferromagnetic ground state with Néel temperature $T_N=125$K. Prior transport measurements in the magnetic and paramagnetic phases\textsuperscript{a} establish that CMO is a $n$-type semiconductor with $n \sim 10^{18} - 10^{19}$cm$^{-3}$ (from native defects like oxygen vacancies) and modestly heavy (large- polaron) mass, $m^* \sim 10m_0$. Here we report transport measurements on single crystal and polycrystalline CMO which reveal a strong current dependence of the resistivity ($\rho$) at low temperatures where $\rho > 10^6$ $\Omega$ cm and impurity-band conduction predominates. For example, at 30 K, $\rho$ decreases by an order of magnitude for small current densities ($J < 100$ $\mu$A/cm$^2$), indicating that the effect is not associated with Joule heating. The possible role of spin-polarized hopping in this phenomenon will be discussed.


\textsuperscript{1}This material is based upon work supported by the National Science Foundation under grants DMR-0072276 (Univ. Miami) and DMR-9982834 (Montana State Univ.).