

Abstract Submitted  
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**Magneto-Spectroscopic Measurements of  $\text{Ca}_3\text{Co}_4\text{O}_9$  Thin Films and Single Crystals**<sup>1</sup> JIUFENG TU, DIMITAR DIMITROV, The City College of New York, WEIDONG SI, QIANG LI, Brookhaven National Lab., CCNY/BNL TEAM — In recent years, the 2D-layered cobaltates have emerged as promising p-type thermoelectric materials due to their unique combinations of high thermoelectric coefficient and good metallic transport properties at ambient temperatures. These systems show high thermoelectric figure of merit and are ideal candidates as the materials of choice at elevated temperatures. We have carried out far-infrared magneto-spectroscopic studies of  $\text{Ca}_3\text{Co}_4\text{O}_9$  thin films as a function of frequency, magnetic field and temperature with the emphasis on the coupling between the lattice, the charge and the spin degrees of freedom. The spectral response is different with magnetic field perpendicular or parallel to the  $\text{CoO}_2$  layers. Below 20K, hysteresis occurs for perpendicular field but not for parallel field. This indicates that the negative magneto-resistance is due to reduced magnetic scattering when Co spins become aligned. Our results are consistent with co-existence of two types of carriers.

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