

# Ultrafast conductivity dynamics in the colossal magnetoresistance $\text{La}_{1-x}\text{Ca}_x\text{MnO}_3$ thin films

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$\text{La}_{1-x}\text{Ca}_x\text{MnO}_3$  is a classic colossal magnetoresistance (CMR) material where the conductivity displays a marked sensitivity to an external magnetic field for reasons that are still not fully understood. The underlying rich physics is a result of the strong coupling of spin, lattice, orbital and charge degrees of freedom. Optical spectroscopy provides experimental access to the underlying interactions in the manganites including, as examples, spin and orbital ordering, and the metal-insulator transition. Further, time-resolved optical spectroscopy can dynamically probe photoinduced changes that drive phase transitions. In this work we report on time resolved terahertz spectroscopic studies of strained  $\text{La}_{1-x}\text{Ca}_x\text{MnO}_3$  thin films, where we observe and control electron-spin-lattice relaxation dynamics with 1.5 eV excitation pulses. We will describe, in detail, the observed differences in the conductivity dynamics as a function of lattice strain.

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