

Abstract Submitted  
for the MAR08 Meeting of  
The American Physical Society

**Electron-phonon interaction and charge carrier mass enhancement in electron doped alkali earth titanate semiconductors** DOOK VAN MECHELEN, DIRK VAN DER MAREL, CLAUDIO GRIMALDI, PETER ARMITAGE, ALEXEY KUZMENKO, HANS HAGEMANN, NICOLAS REYREN, ROLF LORTZ, IGOR MAZIN, University of Genève, Geneva — We have studied the electron-phonon coupling in electron doped SrTiO<sub>3</sub> for which the carrier concentration ranges from a dilute gas of polarons to a polaron liquid. Here we report a comprehensive THz, infrared and optical study together with DC conductivity, Hall effect and specific heat measurements. Our THz spectra at 7 K show the presence of a very narrow ( $< 2$  meV) Drude peak, the spectral weight of which shows approximately a factor of three enhancement of the band mass for all carrier concentrations. The missing spectral weight is regained in a broad ‘mid-infrared’ band which originates from electron-phonon coupling. Analysis of the results yields an electron-phonon coupling parameter of an intermediate strength, a  $\sim 4$ . Specific heat measurements below 4 K show the mass enhancement to be about eight times the band mass for all carrier concentrations. The ostensible discrepancy with the optical mass is interpreted together with the temperature dependence of the Hall constant, the optical spectral weight and the dc scattering rate within the framework of a polaron liquid.

Dook van Mechelen  
University of Genève, Geneva

Date submitted: 13 Dec 2007

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