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Temperature dependent optical properties of thin films of the doped manganite $La_{0.67}Ca_{0.33}MnO_3$[1] NAWEEN ANAND, NAVEEN MARGANKUNTE, DAVID TANNER, Department of Physics, University of Florida, HYOUNGJEEN JEEN, Oak Ridge National Laboratory, Tennessee, AMLAN BISWAS, Department of Physics, University of Florida — Reflectivity as a function of temperature has been measured for thin film samples of the manganite $La_{0.67}Ca_{0.33}MnO_3$across the metal-insulator transition. The optical properties in the infrared and visible range were determined by fits to a Drude-Lorentz model, using exact formulas for the thin film optics and the measured properties of the substrate. The phonon modes were identified and verified with lattice dynamical calculations for distorted orthorhombic crystal structure of the material. The reflectance has a strong temperature dependence in the far infrared and in the region of the phonons, rising as the temperature is lowered and the film becomes metallic. In the near-infrared and visible range, there are conductivity peaks due to electronic band transition shifts to the lower frequencies with decreasing temperature. We also observe the spectral weight shift with temperature.

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