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**Electrodynamics of rare-earth-doped $CaFe_2As_2$**[1] ZHEN XING, T.J. HUFFMAN, PENG XU, A.J. HOLLINGSHAD, D.J. BROOKER, M.M. QAZILBASH, Department of Physics, College of William and Mary, SHANTA SAHA, TYLER DRYE, CONNOR RONCAIOLI, J. PAGLIONE, Center for Nanophysics and Advanced Materials, Department of Physics, University of Maryland, College Park — Rare-earth substitution at alkaline-earth sites leads to the suppression of the spin density wave phase transition in $CaFe_2As_2$ without the emergence of bulk superconductivity. In this work, we perform cryogenic infrared reflectance spectroscopy and spectroscopic ellipsometry on Pr-doped and La-doped $CaFe_2As_2$ single crystals. In both $Ca_{0.8}La_{0.2}Fe_2As_2$ and $Ca_{0.85}Pr_{0.15}Fe_2As_2$ samples, the spin density wave transition is completely suppressed. The temperature dependence of the *ab*-plane optical conductivity of the La-doped $CaFe_2As_2$ crystal exhibits conventional metallic behavior consistent with the absence of any structural, magnetic, or superconducting instabilities. On the other hand, the Pr-doped $CaFe_2As_2$ crystal undergoes a structural transition about 70 K from a tetragonal lattice to a collapsed tetragonal lattice with the same symmetry but reduced volume. In the Pr-doped $CaFe_2As_2$ crystal, the *ab*-plane optical conductivity reveals subtle but distinct spectral changes upon cooling through the structural transition. We provide results on the influence of the structural collapse on the charge dynamics, correlation effects and the electronic configuration.

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