Abstract Submitted
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An infrared view of superconductivity in the iron-based materials[1] ZHEN XING, M. M. QAZILBASH, Department of Physics, College of William and Mary, SHANTA SAHA, J. PAGLIONE, Center for Nanophysics and Advanced Materials, Department of Physics, University of Maryland, College Park — Appropriate chemical doping in the 122 iron arsenides (AFe$_2$As$_2$) usually leads to suppression of the antiferromagnetic order. However, bulk superconductivity does not always occur upon suppression of the antiferromagnetism. In this work we study why some iron-based materials are superconducting while others are not. We have performed cryogenic optical spectroscopy measurements on single crystals of superconducting BaFe$_{1.9}$Pt$_{0.1}$As$_2$ and non-superconducting, rare-earth-doped CaFe$_2$As$_2$. The *ab*-plane dielectric functions have been obtained and compared to one another to gain insight into the conditions necessary for superconductivity in these materials. We also compare the dielectric functions of a number of superconducting and non-superconducting iron-based materials from the published literature. We shall discuss our findings in light of the electrodynamics formulation of the BCS theory of superconductivity.

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