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Correlation between the particle mobility and dielectric constant in a giant electrorheological fluid JASON SHULMAN, FENG CHEN, STEPHEN TSUI, YUYI XUE, Texas Center for Superconductivity and Advanced Materials, University of Houston, C. W. CHU, W. J. WEN, Hong Kong University of Science and Technology — The giant electrorheological (ER) fluid, which consists of a colloid of urea coated $Ba_{0.8}Rb_{0.4}TiO(C_2O_4)_2$ nanoparticles suspended in silicone oil, has been shown to possess a large negative dielectric constant (ε) in the presence of even modest electric fields, although ε is large and positive ($\varepsilon \sim 10^4$) with a zero dc bias. The underlying mechanism that gives rise to this exotic behavior is still unknown. Our work focuses on elucidating the physics encompassing this phenomenon by investigating the temperature effect,*i.e.* by changing the fluid viscosity, on the sign- change and frequency dependence of ε. From this, information of the nanoparticle mobility and possible particle/particle interactions is extracted.

Jason Shulman
Texas Center for Superconductivity and Advanced Materials, University of Houston

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