Abstract Submitted
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Charge Dynamics in Disordered Insulating Materials[1] ALEC SIM, J.R. DENNISON, Utah State University — Modeling and understanding electron transport in disordered insulating materials is fundamentally based on a detailed knowledge of the distribution and occupation of the density of states of nearly free and trapped charged carriers. The conductivity of the material is a key transport parameter in determining charge mobility, how rapidly charge imbalances will accumulate or dissipate, and what equilibrium potential will be established under given experimental conditions. We motivate a discussion of conductivity mechanisms with simple physical concepts that lead to a wide variety of observed physical phenomena. In particular, we extend the standard band model for extended state conduction to include the effects of localized trap states within the band. We discuss trap controlled transport and its relation to the mobility and density of conduction electrons. We consider the following commonly observed conduction mechanisms; thermally activated and variable range hopping conductivity, radiation induced conductivity and luminescence.

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