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The random electric field problem of relaxor ferroelectrics¹ GIAN G. GUZMAN-VERRI, University of Costa Rica Argonne Natl Lab, JOSE RAFAEL ARCE-GAMBOA, CHARLIE HULTGREEN-MENA, University of Costa Rica — Relaxor ferroelectrics are remarkable complex oxide materials: they exhibit diffuse phase transitions with a large frequency dependent dielectric constant over a broad temperature range, non-ergodic behaviour, and huge piezoelectric responses. Their characteristic long-ranged and anisotropic dipolar forces, cubic environment and random electric field make relaxors unique ferroic systems for studying the effects of compositional disorder in phase transitions. While significant progress has been made in recent years towards a more complete understanding of the relaxor behaviour, its mechanism has not been fully understood. It has been pointed out that one of the main challenges is that the problem of random electric fields in cubic systems has not been understood. In this talk, we discuss this problem within a minimal microscopic model and contrast the predicted static dielectric properties with those observed for typical relaxors such as PMN-PT.

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