Abstract Submitted
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Static and Dynamic Properties of Ferroelectric Nanostructures and Multiferroic Bulk Systems: A Multiscale Approach[1] T. MICHAEL, S. TRIMPER, Martin-Luther-University, Halle, Germany, J.M. WESSELINOWA, University of Sofia, Bulgaria — Ferroelectric nanostructures and multiferroic bulk systems are studied in a multiscale approach. The excitation energy, associated damping of ferroelectric modes and polarization are presented as a function of temperature, defect concentration, size and shape. The softening of the mode is strongly influenced by the kind of doping ions, the surface configuration and the defect composition. The analysis is based on a modified Ising model in a transverse field. A Green's function technique in real space provides the static and dynamic properties, which differ significantly from the bulk behavior. Additionally, a mesoscopic approach is carried out similar to the Landau-Lifshitz equation with Gilbert damping for ferromagnets. The temperature dependence of the damping parameters is discussed. The analysis is extended to multiferroic bulk systems, where the magnetic moments interact via the Heisenberg model and the multiferroic coupling term differs for hexagonal and orthorhombic materials. We present the dielectric function and the dynamic properties of the coupled model by applying previous methods.

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