Abstract Submitted
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Dynamical magnetoelectric effects associated with ferroelectric domain walls[1] SERGEY PROSANDEEV, Univ of Arkansas-Fayetteville, ANDREI MALASHEVICH, Yale University, New Haven, IGOR RAEVSKI, Southern Federal University, Rostov-na-Donu, LAURENT BELLAICHE, Univ of Arkansas-Fayetteville — Molecular dynamics simulations using a first-principles-derived effective Hamiltonian are conducted on lead zirconium titanate ultrathin films possessing nanoscale ferroelectric domains and being under GHz electric field. Pulses of magnetization are predicted to occur in this system, when sudden changes of morphology of these nano domains occur. A simple equation relating the magnetization and product between the electrical polarization and its time derivative is further derived from a simple model (via the relation between the magnetization and time derivative of the so-called electrical toroidal moment). This equation naturally explains our numerical findings, as well as previously observed magnetoelectric effects in *moving* ferroelectric domain walls/phase boundaries in ferroelectrics and magnetoelectrics.

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