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Dynamics of domains switching in epitaxial $BaTiO_3/SrTiO_3$ superlattices from first principles[1] SERGEY LISENKOV, INNA PONOMAREVA, LAURENT BELLAICHE, University of Arkansas — Superlattices (SL) consisting of alternating layers of perovskite oxides can possess properties that are dramatically different from those of bulk ferroelectrics. $[BaTiO_3]_n/[SrTiO_3]_n$ (BT/ST) SL with relatively large periods exhibit novel nanostripe domains for some specific epitaxial strains and within a particular temperature window [1]. Here, an effective Hamiltonian approach is used within molecular dynamics method to predict the evolution of these nanostripe domains in BT/ST SL under an *ac* electric field applied along the SL growth direction. For any investigated frequency, four different regions occur, depending on the magnitude of the electric field: Region I that consists of nanostripe domains in both BT and ST layers; Region II that exhibits nanostripe domains in BT layers while possessing monodomains in ST layers; Region III where bubble domains in BT layers coexist with monodomains in ST layers; and Region IV where monodomains form in both BT and ST layers. The dependency of the domain velocities, activation and critical fields on the field frequency is revealed.
[1] Lisenkov et al., *Phys. Rev. B*, **76**, 020102(R) (2007).

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Sergey Lisenkov
Department of Physics, University of Arkansas,
Fayetteville, Arkansas 72701, USA

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