

Abstract Submitted  
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**Depolarizing Field and “Real” Hysteresis Loops in Nanometer Scale Ferroelectric Films** A.M. BRATKOVSKY, Hewlett-Packard Laboratories, Palo Alto, A.P. LEVANYUK, U Autonoma, Madrid — We give detailed analysis of the effect of depolarizing field in nanometer-size ferroelectric capacitors studied by Kim *et al.* [Phys. Rev. Lett. **95**, 237602 (2005)]. We calculate a critical thickness of the homogeneous state and its stability with respect to domain formation for strained thin films of BaTiO<sub>3</sub> on SrRuO<sub>3</sub>/SrTiO<sub>3</sub> substrate within the Landau theory. While the former (2.5nm) is the same as given by ab- initio calculations, the actual critical thickness is set by the domains at 1.6nm [1]. There is a large Merz’s activation field for polarization relaxation. Remarkably, the results show a *negative* slope of the “actual” hysteresis loops, a hallmark of the domain structures in ideal thin films with imperfect screening[2].

[1] A.M. Bratkovsky and A.P. Levanyuk, Appl. Phys. Lett. (in print), cond-mat/0608283.

[2] A.M. Bratkovsky and A.P. Levanyuk, Phys. Rev. B **63**, 132103 (2001).

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