

MECHANISM OF FAST AXIALLY SYMMETRIC  
REVERSAL OF MAGNETIC VORTEX CORE

*O.V. Pylypovskiy*<sup>1</sup>, *D.D. Sheka*<sup>1</sup>, *V.P. Kravchuk*<sup>2</sup>,  
*Yu.B. Gaididei*<sup>2</sup>, *F.G. Mertens*<sup>3</sup>

<sup>1</sup>Taras Shevchenko National University of Kyiv  
(60, Volodymyrs'ka Str., 01601 Kyiv, Ukraine;  
e-mail: engraver@univ.net.ua),

<sup>2</sup>Bogolyubov Institute for Theoretical Physics,  
Nat. Acad. of Sci. of Ukraine  
(14b, Metrolohichna Str., Kyiv 03680, Ukraine),

<sup>3</sup>Physics Institute, University of Bayreuth  
(95440 Bayreuth, Germany)

S u m m a r y

The magnetic vortex core in a nanodot can be switched by an alternating transversal magnetic field. We propose a simple collective coordinate model, which describes the comprehensive vortex core dynamics, including the resonant behavior, weakly nonlinear regimes, and reversal dynamics. A *chaotic dynamics* of the vortex polarity is predicted. All analytical results are confirmed by micromagnetic simulations.