

LIMIT CYCLE FOR A MAGNETIC VORTEX  
DYNAMICS IN 2D NANODOT

*D.D. Sheka, Yu.B. Gaididev<sup>1</sup>, J.G. Caputo<sup>2</sup>,  
J.P. Zagorodny<sup>3</sup>, F.G. Mertens<sup>3</sup>*

Taras Shevchenko Kyiv National University  
(64, Volodymyrska Str., Kyiv 01033, Ukraine;  
e-mail: *denis\_sheka@univ.kiev.ua* ),

<sup>1</sup>M.M. Bogolyubov Institute for Theoretical Physics,  
Nat. Acad. Sci. of Ukraine  
(14b, Metrolohichna Str, Kyiv 03143, Ukraine),

<sup>2</sup>Laboratoire de Mathématiques, INSA de Rouen  
(B.P. 8, 76131 Mont-Saint-Aignan cedex, France),

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

S u m m a r y

The dynamics of a magnetic vortex in a two-dimensional (2D) easy-plane ferromagnet under the influence of a magnetic field, which rotates in the magnet's plane, has been studied. Under such an influence, according to the results of numerical simulations, there appears a limit cycle in the magnetic vortex dynamics which exists in a wide range of field intensities and frequencies. Numerical results have been confirmed by analytical ones obtained in the framework of a new method of collective variables which takes into account both the internal degrees of freedom of the system and the coordinates of the vortex center.