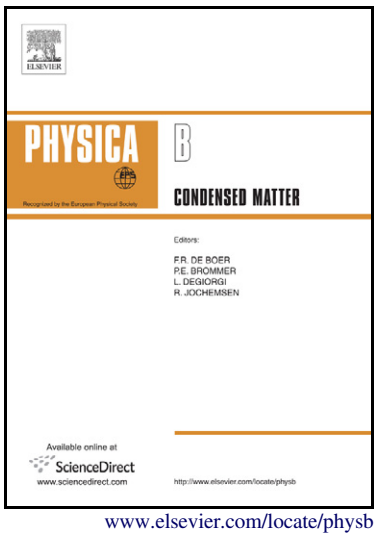


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# THE CRITICAL DYNAMICS OF THE MODELS OF IRON-VANADIUM MAGNETIC SUPERLATTICE

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ABSTRACT

We report the results of a numerical investigation of static and dynamic critical behavior of the anisotropic easy-plane Heisenberg model which is used as a model for iron-vanadium magnetic superlattices. Models of iron-vanadium magnetic superlattice investigated with different values of intralayer and interlayer exchange interactions ratio. Numerical experiment technique, based on the dynamic finite-size scaling theory. Basic features of the time evolution of dynamic parameters for the researched systems are studied. The effect of interlayer exchange interaction value on a character of the critical dynamics is determined. It is confirmed the possibility of application of the Hamiltonian with strong easy-plane anisotropy for investigation both static and dynamic critical behavior of complex planar magnetic models.

Keywords: phase transitions; critical phenomena; finite-size scaling; critical dynamic; numerical experiment; anisotropic easy-plane Heisenberg model.

## 1. INTRODUCTION

The metallic magnetic superlattices consisting of alternating atomic layers of magnetic and nonmagnetic materials arouse great interest in the modern condensed-matter physics [1-3]. The possibility to control the basic properties of superlattices (magnetization, interlayer exchange interaction, magnetoresistance and other characteristics) via the external interaction allows creating structures with predetermined parameters, what makes these materials the unique objects for practical application and theoretical investigation [1-3]. Moreover, the magnetic superlattices provide an ideal facility for practical observance of the continuous crossover from three- to two-dimensional magnetization and inversely.

A situation with investigation of the critical properties of magnetic superlattices is rather complicated at present since the available results are contradictory [4, 5]. The experimental researches of such systems require the materials of very high quality. A production of high-quality