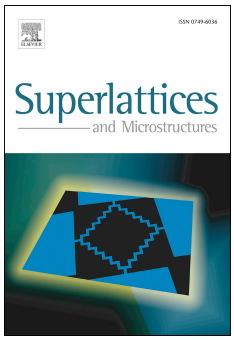
Accepted Manuscript



Compensation temperature in a nano-square with a core-shell structure: Monte Carlo study

S. Aouini, S. Ziti, H. Labrim, L. Bahmad

PII: S0749-6036(16)30591-2

DOI: 10.1016/j.spmi.2016.09.032

Reference: YSPMI 4522

To appear in: *Superlattices and Microstructures*

Received Date: 30 July 2016

Revised Date: 23 September 2016

Accepted Date: 26 September 2016

Please cite this article as: S. Aouini, S. Ziti, H. Labrim, L. Bahmad, Compensation temperature in a nano-square with a core-shell structure: Monte Carlo study, *Superlattices and Microstructures* (2016), doi: 10.1016/j.spmi.2016.09.032.

Compensation Temperature in a Nano-Square with a Core-Shell Structure: Monte Carlo Study

S. Aouini [1], S. Ziti [2], H. Labrim [3] and L. Bahmad [1,*]

[1]Laboratoire de Magnétisme et Physique des Hautes Energies L.M.P.H.E. URAC 12, Mohammed V University of Rabat, Faculty of Sciences, B.P. 1014, Rabat, Morocco.

[2] Laboratoire de Recherche en Informatique, Mohammed V University of Rabat, Faculty of Sciences, B.P. 1014, Rabat, Morocco.

[3] Centre National de l'Energie, des Sciences et des Techniques Nucléaires (CNESTEN), Rabat, Morocco.

1

Abstract:

The aim of this work is to study the magnetic properties of a nano-structure consisting of an anti-ferri-magnetic surface based on a square core-shell. The geometry of the studied system is formed with alternate layers consisting of spins $\sigma = 3/2$ in the core and spins $S = 1$ in the shell. Exactly, we study the effect of the coupling exchange interactions and the crystal field.

We use Monte Carlo simulations to investigate the behavior of this nano-structure. Different phase diagrams were found depending on the parameters of the studied system. The influence of the temperature on the critical and compensation behaviors of this system is also examined. Finally, we showed that the compensation temperature can appear for specific values of system parameters.

Keywords: Nano-Square; Magnetic properties; Core-Shell nanostructure; Monte Carlo simulations; Compensation temperature; Critical temperature; The crystal field.

*) Corresponding author : bahmad@fsr.ac.ma