

Information on Doctoral thesis of Fellows Pham Huong Thao

1. Full name: Pham Huong Thao
2. Sex: Female
3. Date of birth: 03/05/1982
4. Place of birth: Binh Dinh province
5. Admission decision number: 2385/SĐH on 29/06/2007 of President Vietnam National University, Hanoi.
6. Changes in academic process: Changing the name of the thesis with decision number 745-QĐ SĐH-TN on 2/6/2010.
7. Official thesis title: Study on some nanosized magnetic systems
8. Major: Theoretical Physics and Mathematical Physics
9. Code: 62 44 01 01
10. Supervisors: Prof. PhD. Bach Thanh Cong and Prof. PhD. Tran Cong Phong
11. Summary of the new findings of the thesis:
 - The DFT for the earth-doped perovskite systems $R_{0.25}Ca_{0.75}MnO_3$ ($R = La, Nd, Eu, Tb, Ho, Y$) has shown that the Eu-doped compound $Eu_{0.25}Ca_{0.75}MnO_3$ has the largest structure change and Jahn-Teller effect.
 - The phenomenological theory for the tunneling magnetoresistance phenomenon observed in granular perovskite manganese systems was developed using Landauer ballistic transport theory. The results have shown that the field dependence of the magnitude and derivative of the magnetoresistance ratio observed experimentally are well reproduced by the presented theory.
 - The functional integral method (functional integral method - FIM) is used for the system of the quantum spins at finite temperature to study theoretically some nanosized magnetic thin films. The results have shown the enhancement of quantum fluctuation of spin correlations when the thickness of the magnetic system decreases results in destroying the long-range order in the system and this causes the long-range parameters, such as the Curie temperature, magnetization, to decrease when the thickness of the thin film reduces.
 - The FIM for solving Heisenberg model in quasi two dimensional case is applied to find the magnetization, Curie temperature as a function of temperature, thickness and exchange interaction of the

EuO ultrathin films with and without the substrate. Our results have shown that the effect of the nearly independence of the saturation magnetization on the films thickness observed experimentally for EuO thin films may be explained by enhancing the influence of next nearest neighbor exchange interaction.

12. Practical applicability, if any:

- The content of the thesis is topical, the thesis obtains the theoretical results which are new and valuable in science, and contribute in the development of studying nanosized magnetic systems. The results of the thesis have practical value in materials technology.

13. Further research directions, if any:

- Increasing the thickness of thin film and calculating the higher order of Gaussian approximation using the FIM.
- Add anisotropy and dipole interaction in Heisenberg model.
- Using the FIM for other nanosized low dimensional systems.
- DFT with Dmol3 code can be used to solve a lot of important problems, especially magnetic nanosized systems, which play an important role in spintronics.

14. Thesis-related publications:

- Bach Thanh Cong, Pham Huong Thao and Nguyen Tien Cuong (2009), "Tunnelling magnetoresistance in nanometer granular perovskite systems", *Journal of Physics: Conference Series*, 187, p. 012007.
- Bach Thanh Cong, Pham Huong Thao, Nguyen Tien Cuong (08/2009), "Theory for magnetic orders in thin films", *Bao cao trinh bay tai Hoi nghi Vat ly ly thuyet toan quoc lan thu 34*, Dong Hoi.
- Bach Thanh Cong, Pham Huong Thao, Pham Thanh Cong (2010), "Theory for long range magnetic order in nanometer films", *Journal of Physics: Conference Series*, 200, p. 072020.
- Nguyen Hoang Linh, Nguyen Thuy Trang, Nguyen Tien Cuong, Pham Huong Thao, Bach Thanh Cong (2010), "Influence of doped rare earth elements on electronic properties of the $R_{0.25}Ca_{0.75}MnO_3$ systems", *Computational Materials Science*, 50, p. 2.
- Bach Thanh Cong, Pham Huong Thao (2013), "Thickness dependent properties of magnetic ultrathin films", *Physica B*, 426, p. 144.
- Pham Huong Thao, Bach Thanh Cong (2013), Influence of spin fluctuation on the magnetic properties of EuO ultra-thin film, *Communications in Physics*, 23, p. 235.