Magnetic phases in bilayer graphene nanoflake controlled with external electric fields

K. Szałowski[1]

[1] *Department of Solid State Physics, Faculty of Physics and Applied Informatics, University of Łódź, ul. Pomorska 149/153, PL90-236 Łódź, Poland*

The paper presents a computational study of the ground-state magnetic phases in a bilayer rectangular graphene nanoflake [1]. The presence of external electric field with in-plane and perpendicular component is assumed, together with the possible Zeeman splitting of energy levels. The calculations are based on Hubbard model in Mean Field Approximation. The magnetic phase diagram reveals the presence of phases with total spin of 0 and 1. Moreover, significant stability ranges of antiferromagnetic states with layer spin imbalance are predicted within the phase with the total spin equal to 0. All the phases can be controlled with both electric field components. In particular, the antiferromagnetic order parameter can be varied continuously by the field.

References:

[1] K. Szałowski, Carbon **118**, 78–85 (2017).

The computational support on Hugo cluster (P. J. Šafárik University in Košice) is gratefully acknowledged. This work has been supported by Polish Ministry of Science and Higher Education on a special purpose grant to fund the research and development activities and tasks associated with them, serving the development of young scientists and doctoral students.