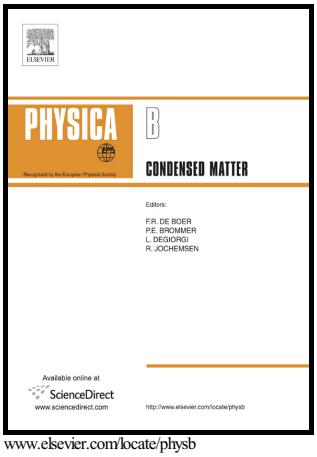
Pauli magnetic susceptibility of bilayer graphene and hexagonal boron-nitride

Hamze Mousavi, Samira Jalilvand, Jamshid Moradi Kurdestany



www.elsevier.com/locate/physb

PII: S0921-4526(16)30392-1
DOI: http://dx.doi.org/10.1016/j.physb.2016.08.049
Reference: PHYSB309618

To appear in: *Physica B: Physics of Condensed Matter*

Received date: 16 June 2016
Revised date: 28 August 2016
Accepted date: 29 August 2016

Cite this article as: Hamze Mousavi, Samira Jalilvand and Jamshid Morad Kurdestany, **Pauli magnetic susceptibility of bilayer graphene and hexagona boron-nitride**, *Physica B: Physics of Condensed Matte* http://dx.doi.org/10.1016/j.physb.2016.08.049

Pauli magnetic susceptibility of bilayer graphene and hexagonal boron-nitride

Hamze Mousavi[1]*, Samira Jalilvand[1] and Jamshid Moradi Kurdestany[2]

[1]Department of Physics, Razi University, Kermanshah, Iran

[2]Department of Physics and Astronomy, University of Missouri, Columbia, Missouri 65201, USA

Abstract

We study the contribution of s and p orbitals on the Pauli magnetic susceptibility (PMS) and density of state (DOS) of the following three structures (1) bilayer graphene (2) bilayer boron-nitride (BN) and (3) bilayer graphene-BN within a two-band tight-binding Harrison Hamiltonian and the Green's function technique. It is shown that in all three cases, the contribution of s and p_x or p_y orbitals have no states around the Fermi level, while for bilayer graphene and graphene-BN the total DOS and DOS of p_z orbital appear to be a linear function around this level. We show explicitly that for bilayer BN the contribution of p_z orbital does not have states around the Fermi level, because of ionization energy difference between the boron (B) and nitrogen (N) atoms. We find that the bandwidth of s, p_x or p_y is more extension than case of p_z orbital as a result of the Van-Hove singularities in the DOS. This leads to consideration of the PMS in two, low and high temperature, regions.

Keywords: Bilayer graphene; Boron-nitride; Susceptibility; Green's function; Tight-binding.

*Corresponding author. Tel./fax: +98 83 3427 4556. E-mail: hamze.mousavi@gmail.com (H. Mousavi).