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Microscopic Theoretical study of Anti-ferromagnetic order in AA-stacked Bilayer Graphene

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Abstract. We address here the anti-ferromagnetic (AFM) order present in AA-stacked bilayer graphene in a transverse applied electric field. The system is described by kinetic energy with nearest neighbor electron-hopping with same hopping integral t_1 for both the layers. Besides this the Coulomb interaction exists at A and B sub-lattices with same Coulomb correlation energy. The electron Green's functions are calculated by Zubarev's Green's function technique. The temperature dependent AFM magnetization is calculated from the Green's functions and is computed numerically and self-consistently. The evolution of the AFM magnetization is studied by varying transverse electric field, Coulomb energy and temperature.

Keywords. Coulomb potential , AFM-magnetization, AA- stacked bilayer graphene

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[Full Paper]