IMEP-LAHC

SEMINAIRE EXCEPTIONNEL

(**de 11h à 12h**, salle Belledonne, IMEP, MINATEC)

Mercredi 13 juillet 2011

"Probing quantum interference effects in epitaxial graphene by STM and low temperature magnetotransport studies"

by Ather MAHMOOD

Abstract: Epitaxial graphene can be grown on silicon carbide substrate via thermal sublimation of the silicon atoms. The graphitization can be obtained under ultra-high vacuum conditions or in controlled atmosphere and starting from the 6H-SiC[0,0,0,1] or the 6H-SiC[0,0,0,-1] surfaces. In order to understand the relationship between growth conditions and the resulting atomic and electronic structure, we have performed the scanning probe and low temperature magneto transport studies of graphitized 6H-SiC surfaces obtained in different conditions. The general surface morphology and atomically resolved Local Density of States (LDOS) is mapped by Scanning Tunneling Microscopy (STM). LDOS mapping demonstrates the observation of quantum interference effects when quasiparticles are scattered off graphene edges, where the later represents line defects. The quantum transport properties are quite sensitive to the nature of disorder in graphene, due mainly to the presence of two additional symmetries: the symmetry between A and B sites in the unit cell (isospin) and the symmetry between the different valleys K-K' (pseudospin). Depending on the intrinsic disorder observed in the sample's morphology and on its mobility, the magneto-resistance shows either the conventional weak localization when intervalley scattering is strong or the weak anti localization (WAL), in agreement with the recent WAL theory for graphene.

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