Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Multiferroïc-like behavior in the quantum Hall ferromagnetic states of a graphene bilayer RENE COTE, JULES LAMBERT, Universite de Sherbrooke — In a quantizing magnetic field, a graphene bilayer has an octet of degenerate states in the Landau level $N = 0$. An electron in this level must be described by three quantum numbers: its spin, its valley index K or K' and an orbital quantum number $n = 0, 1$. In the Hartree-Fock approximation, the ground states of the graphene bilayer at integer filling factors $\nu \in [-3, 4]$ can be described as different kinds of quantum Hall ferromagnets (QHF's) with finite interlayer, inter-orbital, or inter-spin coherence. In this talk, we present the phase diagram of the two-dimensional electron gas (2DEG) in $N = 0$ when the filling factor or a finite interlayer voltage, Δ_B is varied. A finite density of *electric* dipoles is either spontaneously present in the QHF phases with inter-orbital coherence or can be generated by applying an external electric field in the plane of the layers. We show that by changing the strength of this electric field, and so the coupling with the electric dipoles, it is possible to control the degree of *magnetic* polarisation of the 2DEG.

Rene Cote

Date submitted: 17 Nov 2010 Electronic form version 1.4