Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Symmetry protected topological phases in a multi-band 2D electron gas. PETR STEPANOV, YAFIS BARLAS, CHUN NING LAU, Univ of California - Riverside, DMITRY SMIRNOV, National High Magnetic Field Lab, TAKASHI TANIGUCHI, KENJI WATANABE, National Institute for Materials Science — Recently the observation of symmetry protected topological phases was reported in monolayer and bilayer graphenes in the $\nu = 0$ quantum Hall state. Ground state in a multi-band Dirac systems such as ABA-trilayer graphene shows more complex phases than their mono- and bilayer counterparts. Tight-binding Hamiltonian in the absence of out-of-plane displacement field along with the mirror symmetry about the middle layer leads to a presence of non-interacting two bands. Relative shift of bands in the Landau Level energy spectrum map exhibits the existence of conductive counterpropagating phases with values $\sigma_{xx} = 2\alpha e^2/h$ where α is the spin-degeneracy. In addition, out-of-plane displacement field plays a crucial role in mixing those bands leading to broken symmetries and polarizing charge carriers in only bottom or top layer. We will present our most recent studies on quantum Hall phase diagram of $\nu = 0$ in ABA-trilayers.

Petr Stepanov
Univ of California - Riverside

Date submitted: 05 Nov 2015 Electronic form version 1.4