Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Magnetic responce in the quantized spin Hall system with electron correlation JUN GORYO, Institute of Industrial Science, the University of Tokyo, NOBUKI MAEDA — We investigate the magnetic response in the quantized spin Hall (SH) phase of layered-honeycomb lattice system with intrinsic spin-orbit coupling $\lambda_{\rm SO}$ and on-site Hubbard U. The response is characterized by a parameter $g = 4Ua^2d/3$, where a and d are the lattice constant and interlayer distance, respectively. When $g < (\sigma_{xy}^{s2}\mu)^{-1}$, where σ_{xy}^{s} is the quantized spin Hall conductivity and μ is the magnetic permeability, the magnetic field inside the sample oscillates spatially. The oscillation vanishes in the non-interacting limit $U \to 0$. When $g > (\sigma_{xy}^{s2}\mu)^{-1}$, the system shows perfect diamagnetism, i.e., the Meissner effect occurs. We find that superlattice structure with large a is favorable to see these phenomena. We also point out that, as a result of Zeeman coupling, the topologically-protected helical edge states shows weak diamagnetism which is independent of g.

Jun Goryo
Institute of Industrial Science, the University of Tokyo

Date submitted: 16 Dec 2010 Electronic form version 1.4