Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Vortex zero mode and charge of mass skyrmion in graphene[1] CHI-KEN LU, IGOR HERBUT, Physics Department, Simon Fraser University, Burnaby, British Columbia, Canada V5A 1S6 — We investigate the skyrmion formed by the mass order parameters in graphene and bilayer graphene. The skyrmion out of the three quantum anomalous spin Hall order parameters carries charge of 2e and 4e, respectively, in graphene and BA-stacking bilayer graphene. The origin of the above is related to the counting of vortex zero-mode and the representation of Clifford algebra imposed on the mass order parameters. The doubling of charge in bilayer case is due to the Kramers's degeneracy implied by the pseudo time-reversal symmetry, which is a result of the quadratic band touching at low-energy.

[1] Chi-Ken Lu and Igor F. Herbut, Phys. Rev. Lett. **108**, 266402 (2012)
[2] Igor F. Herbut, Chi-Ken Lu, and Bitan Roy, Phys. Rev. B **86** 075101 (2012).

[1]The work has been supported NSERC Canada.

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Date submitted: 26 Nov 2012 Electronic form version 1.4