

Abstract Submitted  
for the MAR13 Meeting of  
The American Physical Society

**Dynamical Band-Engineering of Spin-Polarized Edge States in Nanostructures**<sup>1</sup> BINHE WU, Department of Applied Physics, Donghua University — The ability to engineer the band structure and electronic properties of nanostructures is a key step for potential applications ranging from spintronic devices to quantum information. We present theoretical results on the electronic and transport properties of a normal insulator, in form of a zigzag ribbon based on the graphene-like Kane-Mele model subjected to circularly polarized radiation. It is found that chiral edge-states can be induced in the band gap of the quasi-energy spectra under periodic driving. More interestingly, for appropriate parameters, there exists a single chiral edge state at each boundary of the sample. As a result, the conductance shows plateau structure with the step height  $e^2/h$  as we increase the ac field intensity. These observations may find their potential applications for high-efficiency non-magnetic spin injection which can be readily tuned by modulating an external ac field.

[1] B. H. Wu, Q. Liu, X.-Y. Jiang, and J. C. Cao, Appl. Phys. Lett. 100, 203106 (2012).

<sup>1</sup>The author is grateful to the support by the Natural Science Foundation of China (NSFC, Grant No. 11074266).

Binhe Wu  
Department of Applied Physics, Donghua University,  
2999 North Renmin Road, Shanghai 201620, China

Date submitted: 07 Nov 2012

Electronic form version 1.4