

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

The magneto-optical properties of non-uniform graphene nanoribbons¹ HSIEN-CHING CHUNG, MING-FA LIN, Natl Cheng Kung Univ — When synthesizing few-layer graphene nanoribbons (GNRs), non-uniform GNRs would be made simultaneously. Recently, the non-uniform GNRs, which is a stack of two GNRs with unequal widths, have been fabricated by mechanically exfoliated from bulk graphite. Some theoretical predictions have been reported, such as gap opening and transport properties. Under the influence of magnetic fields, magnetic quantization takes place and drastically changes the electronic properties. By tuning the geometric configuration, four categories of magneto-electronic spectra are exhibited. (1) The spectrum is mostly contributed by quasi-Landau levels (QLLs) of monolayer GNRs. (2) The spectrum displays two groups of QLLs, and the non-uniform GNR behaves like a bilayer one. (3) An intermediate category, the spectrum is composite disordered. (4) The spectrum presents the coexistence of monolayer and bilayer spectra. In this work, the magneto-electronic and optical properties for different geometric configurations are given, such as energy dispersions, density of states, wave functions, and magneto-absorption spectra are presented. Furthermore, the transformation between monolayer and bilayer spectra as well as the coexistence of monolayer and bilayer spectra are discussed in detail.

¹One of us (Hsien-Ching Chung) thanks Ming-Hui Chung and Su-Ming Chen for financial support. This work was supported in part by the National Science Council of Taiwan under grant number 98-2112-M-006-013-MY4.

Hsien-Ching Chung
Natl Cheng Kung Univ

Date submitted: 02 Nov 2014

Electronic form version 1.4