

Abstract Submitted  
for the MAR15 Meeting of  
The American Physical Society

**Magneto-electronic and optical properties of transition metal dicalcogenide monolayers**<sup>1</sup> YEN-HUNG HO, Physics, National Tsing Hua University, Taiwan, CHIH-WEI CHIU, MING-FA LIN, Physics, National Cheng Kung University, Taiwan, WU-PEI SU, Physics and Texas Center for Superconductivity, University of Houston, TX — A generalized tight-binding model is utilized to study the Landau level spectra of various transition metal dicalcogenide monolayers. The intrinsic spin-orbit coupling effectively gives rise to multiple splitting of Landau levels. With a close inspection of wavefunction characteristics, these levels can be classified into specific groups in terms of their orbital, spin and valley signatures. In the calculation of magneto-absorption spectra, the physical origins of optical selection rules are clearly resolved. Compounds are different from one another in terms of transition energies and appearance of twin peaks. Our numerical results clearly demonstrate the magnetic control of spin and valley charge carriers and provide a basis for future experiments.

<sup>1</sup>Robert A. Welch Foundation (E-1070); National Science Council of Taiwan (NSC 101-2112-M-003-005-MY3); NTHU Start-Up Grant (103H11I4)

Yen-Hung Ho  
Physics, National Tsing Hua University

Date submitted: 05 Nov 2014

Electronic form version 1.4