Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Interplay of spin, valley and layer pseudospins in folded MoS_2 bilayers TAO JIANG, HENGRUI LIU, DI HUANG, SHUAI ZHANG, YINGGUO LI, XINGAO GONG, Fudan University, YUEN-RON SHEN, Fudan University and University of California at Berkeley, WEI-TAO LIU, SHIWEI WU, Fudan University
— Two dimensional material such as graphene and transition metal dichalcogenide is much like a piece of sheet paper. Different from sheet paper, each of two dimensional materials has its own crystal lattice. Folding of two dimensional materials can make artificial bilayer or even multilayer structures, whose structural symmetry depend on how the folding line is oriented relative to the crystal lattice. The folded artificial structures with different stacking orders are also expected to tune the interlayer coupling, thus leading to unusual behaviors and new phenomena. In this talk, I will present our recent study of folded MoS_2 bilayers, which were obtained by folding exfoliated MoS_2 monolayers. As characterized by second harmonic generation and photoluminescence, folded bilayers can exhibit broken inversion symmetry and reduced interlayer coupling, evoking strong valley and/or spin polarizations that were not achieved in natural MoS_2 bilayer of Bernal stacking. Our work provides an effective and versatile means to understand the interaction between spin, valley and layer pseudospin degrees of freedom in MoS2 bilayer and engineer transition metal dichalcogenide materials with desirable electronic and optical properties.

Tao Jiang
Fudan University

Date submitted: 04 Nov 2014 Electronic form version 1.4