

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Family-Dependent Rectification Characteristics in Ultra-Short Graphene Nanoribbon p-n Junctions JIAXIN ZHENG, XIN YAN, LILI YU, HONG LI, RUI QIN, State Key Laboratory of Mesoscopic Physics, Department of Physics, Peking University, Beijing 100871, P. R. China, GUANGFU LUO, Department of Theoretical and Computational Molecular Science, Institute for Molecular Science, Okazaki 444-8585, Japan, ZHENGXIANG GAO, DAPENG YU, JING LU, State Key Laboratory of Mesoscopic Physics, Department of Physics, Peking University, Beijing 100871, P. R. China — We present the first transport property investigation of a-few-nm-long armchair graphene nanoribbon (AGNR) p-n junctions by using first-principles method. Intriguingly, family-dependent rectification is observed. To be specific, traditional rectification effect in the forward direction is observed in the AGNR p-n junctions with $3n$ and $3n+2$ widths whereas reverse rectification effect is observed in the AGNR p-n junctions with $3n+1$ width. The analysis of the spatial distribution of molecular projected self-consistent Hamiltonian eigenstates and the projected density of states give an insight of the observed results.

Jiaxin Zheng
State Key Laboratory of Mesoscopic Physics, Dept of Physics,
Peking University, Beijing 100871, P. R. China

Date submitted: 14 Nov 2011

Electronic form version 1.4