

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Measurement of work function difference between Pb/Si(111) and Pb/Ge/Si(111) by high-order Gundlach oscillation HSU SHENG HUANG, WEN YUAN CHAN, WEI BIN SU, Institute of Physics, Academia Sinica, Nankang, Taipei 11529, Taiwan, GERMAR HOFFMANN, Department of Physics, National Tsing Hua University, Hsinchu 30013, Taiwan, CHIA SENG CHANG, Department of Physics, National Taiwan University, Taipei 10617, Taiwan, INSTITUTE OF PHYSICS, ACADEMIA SINICA, NANKANG, TAIPEI 11529, TAIWAN COLLABORATION, DEPARTMENT OF PHYSICS, NATIONAL TAIWAN UNIVERSITY, TAIPEI 10617, TAIWAN COLLABORATION, DEPARTMENT OF PHYSICS, NATIONAL TSING HUA UNIVERSITY, HSINCHU 30013, TAIWAN COLLABORATION — Ge films can be grown between the Pb overlayer and Si(111) substrate by the surfactant-mediated epitaxy. We detect the high-order Gundlach oscillation revealed in scanning tunneling microscopy (STM) to measure the work function difference between Pb/Si(111) and Pb/Ge/Si(111). Owing to different dielectric responses of Si and Ge, the tunneling current on Pb/Si has to be larger than that on Pb/Ge/Si by a factor of 2-3 to establish the same electric field in STM gap on both regions. This condition leads us to obtain a work function difference of 200 meV from observing Gundlach oscillation. It is believed that the method developed in this work can be extended to measure the work function difference of bulk materials as well.

Hsu Sheng Huang
Institute of Physics, Academia Sinica, Nankang, Taipei 11529, Taiwan

Date submitted: 07 Nov 2013

Electronic form version 1.4