Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Zero-field spin-splitting in $Al_xGa_{1-x}N/GaN$ heterostructures IKAI LO, M.H. GAU, W.T. WANG, J.K. TSAI, S.F. TSAY, J.C. CHIANG, Department of Physics, Center for Nanoscience and Nanotechnology, National Sun Yat-Sen University, Kaohsiung, Taiwan, Republic of China., DEPARTMENT OF PHYSICS, CENTER FOR NANOSCIENCE AND NANOTECHNOLOGY, NATIONAL SUN YAT-SEN UNIVERSITY, COLLABORATION — We have observed the beating Shubnikov-de Haas oscillations with respect to the zero-field spin splitting of 2DEG in $Al_xGa_{1-x}N/GaN$ heterostructures. The spin-splitting energy was obtained about 9 meV from the beating SdH frequency derived by the non-linear curve fitting. A new mechanism ($\Delta_{C1} - \Delta_{C3}$ coupling) was proposed to describe the large spin splitting in wurtzite GaN, which is originated from the band folding effect and intrinsic wurtzite structure inversion asymmetry. The band-folding effect generates two conduction bands (Δ_{C1} and Δ_{C3}), in which p-wave probability has tremendous change when k_z approaches anti-crossing zone. The $\Delta_{C1} - \Delta_{C3}$ coupling can produce a spin-splitting energy much larger than traditional Rashba or Dresselhaus effects. This project is supported in parts by National Science Council, Core Facilities Laboratory in Kaohsiung-Pintung area, Taiwan (ROC).

Ikai Lo
Department of Physics, Center for Nanoscience and Nanotechnology
National Sun Yat-Sen University, Kaohsiung, Taiwan, Republic of China

Date submitted: 16 Nov 2005 Electronic form version 1.4