Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

**Direct current bias effect on the magnetoresistance of submicron spin-valve ellipses**[1] CHIEN-TU CHAO, S.G. LAI, JONG-CHING WU, LANCE HORNG, National Changhua University of Education, TE-HO WU, National Yun-lin University of Science & Technology, S. YOSHIMURA, M. TSUNODA, M. TAKAHASHI, Tohoku University, TAIWAN SPIN RESEARCH CENTER TEAM — Submicron spin-valve devices with nonmagnetic I/V leads have been successfully fabricated using E-beam lithography in conjunction with an ion beam etching.. The layer structures are SiO2/Ta(5nm)/ NiFe(2nm)/ MnIr(10nm)/CoFe(2nm)/Cu(2.5nm)/CoFe(2nm)/NiFe(3nm)/Cu(1nm)/Ta-O(3nm) prepared by DC sputtering. Low field ac MR measurements were carried out with an external magnetic field applied parallel to the biasing/current direction. A significant shift on minor loop, with respect to that of the non-patterned film, is associated with an antiferromagnetic coupling resulted from the pinned layer's stray field after patterning. In addition, a direct current bias was superimposed to the low field ac for the studies of joule heating and possible spin transfer torque effect. In comparison to the MR measured at various ambient temperatures Joule heating effect was identified from the resistance background change. Extra features were developed during the magnetization reversal that may be associated with spin torque effect. Details of the MR minor loops regarding to the magnetization evolution and the switching mechanism will be presented.

[1]Work is supported by the Ministry of Economic affairs of Taiwan.

Jong-Ching Wu
National Changhua University of Education

Date submitted: 09 Dec 2005 Electronic form version 1.4