Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

**Investigation on the valence-band structure of ferromagnetic-semiconductor GaMnAs using spin-dependent resonant tunneling spectroscopy** SHINOBU OHYA, Dept. of Electrical Eng. and Information Systems, The Univ. of Tokyo/ JST, IRIYA MUNETA, PHAM NAM HAI, MASAAKI TANAKA, Dept. of Electrical Eng. and Information Systems, The Univ. of Tokyo — We investigate the valence-band (VB) structure of ferromagnetic-semiconductor GaMnAs by analyzing the resonant tunneling levels of a GaMnAs quantum well (QW) in double-barrier heterostructures. The resonant level from the heavy-hole first state (HH1) is clearly observed in the metallic GaMnAs QW with the Curie temperature of 60 K, which indicates that no holes reside in the VB of GaMnAs in the equilibrium condition. Clear enhancement of tunnel magnetoresistance induced by resonant tunneling is demonstrated. We find that the resonant levels formed in the GaMnAs QW are well explained by using the transfer matrix method with the 6x6 Luttinger-Kohn $kp$ Hamiltonian, $p-d$ exchange Hamiltonian, and Bir-Pikus strain Hamiltonian. The VB structure of GaMnAs is well reproduced by that of GaAs with a small exchange splitting energy of 3-5 meV and with the Fermi level lying at $\sim$30 meV higher than HH1 in the bandgap. This work was partly supported by Grant-in-Aids for Scientific Research, the Special Coordination Programs for Promoting Science and Technology, R&D for Next-generation Information Technology by MEXT, and PRESTO of JST.

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Date submitted: 17 Nov 2009 Electronic form version 1.4