Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

**Magnetotunneling Spectroscopy in InGaAs Double-well Structures** Y. LIN, National Tsing Hua University, Taiwan, A.K.M. NEWAZ, , E.E. MENDEZ, SUNY at Stony Brook, J. NITTA, Tohoku University, Japan — We have used magnetotunneling spectroscopy to elucidate the mechanism of electron tunneling in double-well (DW) heterostructures whose current-voltage ($I-V$) characteristics are quite different from the $\delta$-function-like shapes expected from energy- and momentum-conservation laws. Our DW tunneling structure consisted of two $In_{0.53}Ga_{0.47}As$ wells 53 Å and 82 Å wide, confined by $In_{0.52}Al_{0.48}As$ barriers with thickness of 100 Å , 53 Å and 100 Å . Without magnetic field, at $T = 4.2$K the $I-V$ characteristics had several distinct regions, each one quasi- triangular in shape and corresponding to the alignment of states in adjacent wells. Under a field ($H \leq 14$T) parallel to the current, each region revealed strong features that shifted to higher voltages with increasing field and are related to Landau levels from states in individual wells. The field dependence of those features yielded, in addition to the band parameters, the zero-field energies of the states at representative voltages of the $I-V$ characteristics. In the physical picture that emerges from the analysis, electrons tunnel via the two wells as long as in each of them there are states below the emitter's Fermi energy, without any consideration to in-plane momentum (or Landau-level index) conservation. This conclusion is supported by remarkably similar results we have also obtained in GaAs-GaAlAs double- well structures.

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Date submitted: 30 Nov 2005 Electronic form version 1.4