Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

**Quasi-one-dimensional spin polarized states in T-shaped nanostructures** PAWEL REDLINSKI, BOLDIZSAR JANKO, University of Notre Dame — We present results of theoretical and numerical investigations of T-shaped semiconductor nano-wire structures. Such structures have been synthesized in Molecular Beam Epitaxy laboratories by using traditional (GaAs) and magnetic (GaMnAs) semiconductors. The wire is formed in a three-stage MBE process and in its final form, the structure looks as if one quantum well (QW) called Stem well grew perpendicularly into the second QW, the so-called Arm well. The quasi 1D states are formed at the intersection of the two QWs. Typically in the T-shaped structures the thickness of the wire is of order of few nm. For such thickness there is only one conduction channel and the energy states of quasi-particles are indexed by a single quantum number, the 1D linear momentum $k$, and by its spin. There are two distinctive features present in this type of systems: strong spin-orbit coupling, and the lack of square symmetry of the wire cross section. These features have profound implications and make this system very important from theoretical point of view. Results, obtained within the $\boldsymbol{k}\bullet\boldsymbol{p}$ formalism, show that at $k \neq 0$ the valence band states are non-degenerate with respect to the spin degree of freedom. Both dispersions of spin up and spin down states are well modeled as parabolic bands but with different effective masses. It opens possible to manipulate the spin degrees of freedom in a T-shaped quantum structure.

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Date submitted: 16 Jan 2006 Electronic form version 1.4