

Abstract Submitted
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**Diluted Magnetic Double Barrier Resonant Tunneling Structures
for Novel Magnetically-Defined Quantum Dot and Nano Structures¹**

ZAILI FANG, A.M. CHANG, Department of Physics, Duke University, Durham, NC 27708, X.Y. LIU, J.K. FURDYNA, Department of Physics, University of Notre Dame, Notre Dame, IN 46556 — The further development of Spintronics requires the direct control of the spin degree of freedom. A milestone on the path towards this accomplishment has been recently achieved by the demonstration of the successful operation of a magnetic resonant tunneling diode ². We will report our results on manganese doped double barrier tunneling structures (II-IV group) with varying doping, confining potential and well width. These structures, in which both the barrier and well are doped with manganese, show a Zeeman splitting tendency in the vertical transport through the barrier in magnetic field. This tendency can be exploited as spin filter for spintronic applications. Based on this spin voltage transport property of diluted magnetic semiconductor heterostructures and the interaction of superconductors and semiconductors, we propose a novel spin aligned vertical quantum dot device. Progress on the fabrication of this device will also be reported.

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²A. Slobodskyy *et al.*, Phys. Rev. Lett. **90**, 246601 (2003)

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