Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Spin field effect transistors with ultracold atoms[1] G. JUZELIUNAS, J. RUSECKAS, Institute of Theoretical Physics and Astronomy of Vilnius University, CHARLES W. CLARK, J.Y. VAISHNAV, Joint Quantum Institute, National Institute of Standards and Technology — We propose a method of constructing cold atom analogs of the spintronic device known as the Datta-Das transistor (DDT), which despite its seminal conceptual role in spintronics, has never been successfully realized with electrons. We propose two alternative schemes for an atomic DDT, both of which are based on the experimental setup for tripod stimulated Raman adiabatic passage. Both setups involve atomic beams incident on a series of laser fields mimicking the relativistic spin orbit coupling for electrons that is the operating mechanism of the DDT.

[1]J. Y. Vaishnav, J. Ruseckas, Charles W. Clark, G. Juzeliunas, Phys. Rev. Lett., in press (arXiV:0807.3067) (2008).

J.Y. Vaishnav
Joint Quantum Institute, National Institute of Standards and Technology

Date submitted: 03 Feb 2009 Electronic form version 1.4