Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Manipulation of p-wave scattering of cold atoms in low dimensions using the magnetic field vector[1] SHI-GUO PENG, Wuhan Institute of Physics and Mathematics, Chinese Academy of Sciences, Wuhan 430071, China, SHINA TAN, Georgia Institute of Technology, KAIJUN JIANG, Wuhan Institute of Physics and Mathematics, Chinese Academy of Sciences, Wuhan 430071, China
— It is well known that the magnetic Feshbach resonances of cold atoms are sensitive to the magnitude of the external magnetic field. Much less attention has been paid to the *direction* of such a field. In this work we calculate the scattering properties of spin polarized fermionic atoms in reduced dimensions, near a p-wave Feshbach resonance. Because of spatial anisotropy of the p-wave interaction, the scattering has nontrivial dependence on both the magnitude and the direction of the magnetic field. In addition, we identify an inelastic scattering process which is impossible in the isotropic-interaction model; the rate of this process depends considerably on the direction of the magnetic field. Significantly, an EPR entangled pair of identical fermions may be produced during this inelastic collision. This work opens a new method to manipulate resonant cold atomic interactions.

[1]CPSF (Grant No. 2012M510187), Special Financial Grant from CPSF (Grant No. 2013T60762), the NSFC projects (Grant No. 11004224 and No.11204355) and the NFRP- China (Grant No. 2011CB921601), NSF (Grant No. PHY-1068511), Alfred P. Sloan Foundation

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Date submitted: 13 Nov 2013 Electronic form version 1.4