Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Generating spin current by AC magnetic field MINHUI SHANGGUAN, Center of theoretical and computational physics and Department of Physics, The University of Hong Kong, Pokfulam Road, Hong Kong, China, QINGFENG SUN, Institute of Physics, Chinese Academy of Sciences, Beijing, P.R. China, JIAN WANG, Center of theoretical and computational physics and Department of Physics, The University of Hong Kong, Pokfulam Road, Hong Kong, China, HONG GUO, Department of Physics, McGill University, Montreal, Quebec, Canada — We report a theoretical investigation on the possibility of generating pure spin current without an accompanying charge current, by applying a train of magnetic field pulses on the leads of a tunnel junction. When the duration of on-state of the pulse is shorter than the spin relaxation time while the off-state is longer than it, a spin current is driven through the two-probe device coherently. The time averaged spin current is found to be almost a periodic function of the pulse strength. A negative spin current can also be produced for a positive spin chemical potential, due to quantum interference among the Fourier modes of the photon assisted tunneling.

Minhui ShangGuan
The University of Hong Kong

Date submitted: 28 Nov 2005 Electronic form version 1.4