Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Numrical simulation of a spin interferometer based on a single square loop with Rashba interaction ZHENYUE ZHU, QING-FENG SUN, BIN CHEN, XIN-CHENG XIE, Oklahoma State University — We numerically calculate the transverse conductance as a function of magnetic field in two models. One is an exact 1D model and the other is a quasi 1D square loop system which is similar to the experimental setup by Koga et. al. From the conductance curves, we employ FFT (Fast Fourier transform) and IFFT (inverse Fast Fourier transform) to extract separately the oscillatory part of conductance whose period correspond to the magnetic flux quanta (AB oscillation) and half quanta (AAS oscillation). We show that the spin precession angle θ is modulated by the Rashba interaction strength. From the curves about the amplitude of AB or AAS oscillations at B=0 versus θ, we find that the node positions of θ in the exact 1D model fits well with previous theoretical calculations, but there are some deviations for the quasi 1D model.

Zhenyue Zhu
Oklahoma State University

Date submitted: 05 Dec 2005 Electronic form version 1.4