Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Terahertz excitation and control of spin photocurrents in a semiconductor nanostructure[1] NELSON STUDART, ANIBAL BEZERRA, Departamento de Fisica - UFSCar / DISSE - INCT, LEONARDO CASTELANO, Departamento de Fisica - UFSCar, PAULO FARINAS, Departamento de Fisica - UFSCar / DISSE - INCT, MARCELO MAIALLE, MARCOS DEGANI, Faculdade de Ciencias Aplicadas - UNICAMP / DISSE - INCT — Time dependent calculations of induced photocurrents are presented for ZnMnSe semiconductor nanostructures under the action of a static magnetic field of a few Tesla. The study shows the existence of spectral domains in the THz range for which the spin polarization in the photocurrent is strongly sensitive to static biases applied in the growth direction of the structures. For such photon frequencies, changing the bias is predicted to reverse the spin polarization quite effectively for specific absorption frequencies. This behavior suggests the possibility of conveniently simple mechanisms for switching and torque generation. The physics underlying these results is studied and understood in terms of the spin dependent profiles of the structures.

[1]Work supported by DISSE - INCT - CNPq - Brazil.

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Date submitted: 03 Dec 2012 Electronic form version 1.4