

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**Microwave phase detection with a magnetic tunnel junction**<sup>1</sup> XIN FAN, Department of Physics and Astronomy, University of Delaware, SANGCHEOL KIM, Department of Electrical Engineering and Computer Science, University of Delaware, XIAOMING KOU, Department of Physics and Astronomy, University of Delaware, JAMES KOLODZEY, Department of Electrical Engineering and Computer Science, University of Delaware, HUAIWU ZHANG, State Key Laboratory of Electronic Films and Integrated Devices, University of Electronic Science and Technology of China, JOHN XIAO, Department of Physics and Astronomy, University of Delaware — A magnetic tunnel junction (MTJ) can detect microwave magnetic field due to the interplay between the ferromagnetic resonance and tunneling magneto resistance. Based on the fact that the tunneling resistance change is quadratically proportional to the rf magnetic field, we have designed a mixing circuit in which two microwaves interfere, giving rising to a dc voltage containing the phase difference between the two microwaves. With ability to detect microwave intensity and phase, the MTJ-based device may be used for on-chip microwave network analyzer and spectrum analyzer.

<sup>1</sup>This work has been supported by NSF DMR0827249 and NSF IIP- 1013468. Work at UCD was supported by NSF DMR-1008791 and NSF ECCS-0925626.

Xin Fan  
Department of Physics and Astronomy, University of Delaware

Date submitted: 28 Nov 2010

Electronic form version 1.4