Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

**Phase cycling for optical two-dimensional Fourier-transform spectroscopy**[1] TRAVIS AUTRY, Department of Physics, University of Texas, Austin TX 78712, GALAN MOODY, HEBIN LI, MARK SIEMENS, STEVEN CUNDIFF, JILA, University of Colorado and National Institute of Standards and Technology, Boulder CO 80309 — Phase-cycling has been implemented in optical two-dimensional Fourier-transform spectroscopy to extract signals from quantum wells and quantum dots and to eliminate noise such as pump scatter co-propagating with the four-wave mixing signal. Experiments using actively phase-stabilized interferometers to cycle the excitation pulse optical phases suffer from partial noise cancellation because excitation and phase-control laser wavelengths are incommensurate. To obtain full noise elimination, we have incorporated liquid crystal variable retarders capable of imposing a $\pi$ phase shift for wavelengths 650-950 nm. We present non-rephasing spectra of potassium vapor contained in a $\sim$20 $\mu$m transmission cell and show that this phase cycling method removes all noise from pump scatter while drastically reducing the data acquisition time compared to mechanical phase-delay techniques.

[1]This work was supported by an NSF-REU grant at the University of Colorado-Boulder.

Travis Autry
Department of Physics, University of Texas, Austin TX 78712

Date submitted: 23 Dec 2010 Electronic form version 1.4