

# UCCS Mathematics/Physics

## Colloquium

Thursday, November 11<sup>th</sup>

12:30 pm – 1:30 pm

(Refreshments at 12:15 pm)

UC 307

Dr. Marek Grabowski, Department of Physics  
University of Colorado at Colorado Springs

### Dynamics of a Driven Spin

Abstract: Current fundamental theories of space-time manifolds are based on causally evolving spin networks. The rules of evolution are given by quantum amplitudes and therefore are intrinsically linear. To extend these theories to nonlinear domain we begin with a simple model of externally driven single spin on a quasi-two-dimensional slice manifold. This model's dynamics is quite complex, exhibiting asymptotic limit cycles, quasi-periodicity and stochastic attractors. Coherent states representation of these states facilitates quantization of this nonlinear system.

Many of these results can be applied in two other contexts as well. The first being the ferromagnetic resonance in thin film nanostructures (current experimental efforts of the UCCS Physics Department), and the second is the fractional quantum Hall effect in graphene (most recent Noble prize in Physics).

