



2012 Fall Physics Colloquium Series

Chris Thron, Ph.D.

Assistant Professor, Texas A & M University-Central Texas

A Signal Processing Model of Quantum Mechanics

This talk presents a conceptual model of quantum mechanics as an accumulation-and-threshold process. The model (developed in collaboration with Johnny Watts) arises from an analogy with signal processing in wireless communications. Complex wavefunctions are interpreted as expressing the amplitude and phase information of a modulated carrier wave. Particle transmission events are modeled as the outcome of a process of signal accumulation that occurs in an extra (non-spacetime) dimension.

Besides giving a natural interpretation of the wavefunction and the Born rule, the model accommodates the collapse of the wave packet and other quantum paradoxes such as EPR and the Aharonov-Bohm effect. The model also gives a new perspective on the 'relational' nature of quantum mechanics: that is, whether the wave function of a physical system is "real" or simply reflects the observer's partial knowledge of the system. We simulate the model for a 2-slit experiment, and indicate possible deviations of the model's predictions from conventional quantum mechanics. We also indicate how the theory may be extended to a field theory.

October 3, 2012

4:00 p.m.

Room E.125, Baylor Sciences Building

Reception at 3:40 p.m. in BSB D.311

For more information contact:

Dr. Anzhong Wang 254- 710- 2276