



# *Physics & Astronomy Colloquium*

## *Fall 2022*



**Tuesday, November 29<sup>th</sup> at 3:30 pm**

Location: Science 234

**Dr. Edward Quitevis**

Department of Chemistry Texas Tech University

### **Optical Kerr Effect Spectroscopy of Liquids - Probing Liquid-State Dynamics from Simple Liquids to Complex Fluids**

**Abstract:** One of the major areas of research in the Quitevis group is understanding the dynamics of liquids using optical Kerr effect spectroscopy. The variant of OKE spectroscopy used in my labs is optical heterodyne-detected Raman induced Kerr spectroscopy (OHD-RIKES). OHD-RIKES is a femtosecond nonlinear time-domain technique that measures the collective polarizability anisotropy correlation function of a liquid. At timescales longer than a picosecond or so, the polarizability anisotropy is dominated by diffusive orientational motions, and at shorter timescales by intermolecular dynamics associated with frustrated inertial motion motions of the molecules. By use of a Fourier-transform deconvolution procedure, the OHD-RIKES transients can be converted to a spectral density which is directly related to the depolarized Raman spectrum of the liquid. To illustrate how OKE spectroscopy provides insights into the molecular motions in a liquid and the intermolecular forces that govern these motions, previous studies performed by the Quitevis group on various types of liquids, from simple molecular liquids to complex fluids, such as liquid crystals and ionic liquids, will be described.

**Refreshments at 3:00PM in SC 103**