Physical Chemistry Seminar

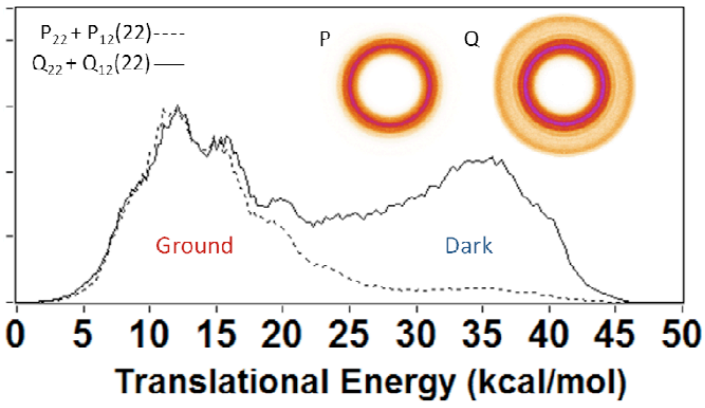
Tuesday, February 19, 2013 | **11:00 am** | **Room 1315 Chemistry Building**

Roaming in the Dark: Solving the Complex Photochemistry of the Nitrate Radical

Professor Simon North

Department of Chemistry
Texas A&M University

Host: Professor Frank Keutsch



It has been over a century since the nitrate radical, NO_3, was first observed by optical absorption[1] but the mechanism of NO and O_2 production through the visible photolysis has long proven elusive. Recent ion imaging studies and *ab initio* calculations have suggested that two distinct pathways are responsible for molecular products and that both pathways involve 'roaming dynamics' on the 'dark' excited electronic state. Thus, the $NO_3 \rightarrow NO + O_2$ reaction proceeds in the absence of a traditional transition state. New detailed vector correlation and Λ doublet propensity measurements, along with *ab initio* calculations, confirm that both pathways arise from roaming-type mechanisms, but each pathway arises from roaming on a different electronic potential (*Science*, 355, 1075 (2012)). This compelling evidence opens additional questions regarding this unusual reaction mechanism and the prevalence of multistate roaming in other molecular systems.

1. J. Chappuis, *Ann. Sci. Ec. Norm. Sup.*, **1882**, 11, 137.

Refreshments will be available prior to the seminar at 10:45 a.m. outside room 1315

Graduate Students may meet with the speaker at 1:00 p.m. in Room 8335