



## Glenn T. Seaborg Center Seminar

### Using photoelectron and fluorescence spectroscopy to probe the electronic structures of heavy element compounds

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The bonding and electronic structure of simple actinide compounds such as ThO, UO and UO<sub>2</sub> is being explored using high-resolution photoelectron and fluorescence spectroscopy. Most recently, Stark spectroscopy has been used to determine the dipole moment of ThO. These measurements test recent theoretical calculations and are relevant to attempts to measure the dipole moment of the electron. Studies of HfO and NdO are being carried out for comparisons with the isoelectronic species ThO and UO. Results from this work, and the implications from ligand field theory models, indicate that the 5*f* orbitals are not significantly involved in the bonding for U and Th. However, the cylindrical symmetry of a diatomic (or linear triatomic) restricts the possible interactions of the *f*-orbitals. Studies of compounds with lower symmetry are in progress, and initial photoionization results for the U-benzene complex will be presented.