Dipole-forbidden 5d-5f Electronic Structure in Actinide Systems
JOSEPH BRADLEY, University of Washington, SUBHRA SEN GUPTA, University of British Columbia, GERALD SEIDLER, University of Washington, GEORGE SAWATZKY, University of British Columbia, STOSH KOZIMOR, STEVEN CONRADSON, KEVIN BOLAND, DAVID CLARK, Los Alamos National Lab, UNIVERSITY OF WASHINGTON PHYSICS COLLABORATION, UNIVERSITY OF BRITISH COLUMBIA COLLABORATION, LOS ALAMOS NATIONAL LAB COLLABORATION — We report the first measurements of nonresonant inelastic x-ray scattering (NIXS) from the semi-core 5d levels of several actinide compounds. We find that the lowest energy electronic excitations form a rich spectrum of resonances having quite large angular momentum and whose general characteristics are predominantly dependent on the valence electron configuration rather than the nominal valence of the excited species. Comparison with atomic multiplet calculations strongly supports these observations while also illustrating a new complexity to the excited-state spectrum of actinide compounds: good agreement with experiment, subject to realistic considerations about screening effects, are achieved only when one includes the configuration interaction between the 5f and 6f states.