

Inorganic/Physical Seminar

Monday, March 1, 4pm

Virtual Event

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*“Electron (De)Localization in f-Element Systems:
From Fundamental Questions to QIS Design Principles”*

Abstract: The La Pierre group studies how collective magnetic, physical, and chemical properties arise from electron (de)localization phenomena in f-element systems. Our studies include the development of solid-state and solution methodologies for the synthesis of novel lanthanide and actinide (Th - Pu) materials and complexes. These synthetic efforts are paired with synchrotron and neutron spectroscopies and physical property studies to break down the challenge of understanding the electronic structure of f-element systems. Particularly in solid-state systems, the f-elements present unique valence electronic structures due to the near degeneracies engendered in these systems and strong electron correlation. Our efforts to-date have focused on the synthesis and analysis of systems governed by one of three phenomena: magnetic super-exchange (i.e. exchange coupled systems), multi-configurational electronic structures (ground state degeneracy including hybridization with ligand/band states), and mixed-valence metal ions (i.e. mixed f/d occupancy and mixed-oxidation states). Understanding and controlling the manifestation of these phenomena in molecular systems is crucial for understanding the interplay of these phenomena underpinning topological insulators such as SmB₆ and PuB₆ and superconductors such as CeCoIn₅ and PuCoGa₅. In turn, the group has employed this expanded fundamental understanding of f-element electronic structure to construct components of quantum information technologies (e.g. qubits, single-molecule magnets).



Zoom Meeting: <https://rochester.zoom.us/j/95816747422?pwd=c0dNa1EzM3BMVjc0a0Zvd0xYTTUzUT09>

Meeting ID: 958 1674 7422 | **Password:** 211656

Website: https://events.rochester.edu/event/chemistry_inorganic-physical_seminar_lapierre

Host: Prof. Michael Neidig • **Email:** neidig@chem.rochester.edu