



Department of Physics and Astronomy  
SPRING 2023 Colloquium Series

# “Intriguing High-Temperature High-Magnetic-Field Phase Boundary due to Valence Transition in $\text{CeOs}_4\text{Sb}_{12}$ ”

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The filled skutterudite compound  $\text{CeOs}_4\text{Sb}_{12}$  displays Kondo-insulating behavior with accompanied by a  $\sim 1$  K antiferromagnetic (AFM)/Spin-Density-Wave (SDW) order state. Recently it has also been suggested as a potential topological insulator. In quantum oscillation measurements, we found a nearly spherical Fermi-surface of  $\text{CeOs}_4\text{Sb}_{12}$ , which is much different than those of  $\text{LaOs}_4\text{Sb}_{12}$ ,  $\text{PrOs}_4\text{Sb}_{12}$ , and  $\text{NdOs}_4\text{Sb}_{12}$ . In addition, an unusual reverse-wedge shaped phase boundary in the temperature  $T$  vs magnetic field  $H$  phase diagram associated with the valence transition from the  $\text{Ce}^{3+}$  to  $\text{Ce}^{4+}$  states, which is denoted as an H phase and an L phase, respectively. Consequently, the recently established phase boundary of L to H phase [2] seems much broader than the originally proposed one in the  $T$ - $H$  phase diagram [1]. In this presentation, an overview of strongly correlated electron physics will be given before discussing the intriguing properties of  $\text{CeOs}_4\text{Sb}_{12}$ .

**Thursday, May 11, 2023**

**4:00 - 5:20PM**

**MND1015**

*Open & Free to all students, faculty and public*