

Do WIMPs Rule?

The Search for Cosmic Dark Matter

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Dan Akerib has been searching for dark matter since the early 1990s. He did his undergraduate work at the University of Chicago and his Ph.D. at Princeton, followed by postdoctoral appointments at Caltech and Berkeley. He was a faculty member at Case Western Reserve University for 18 years until he joined the Stanford faculty in 2014. Akerib is a member of the Department of Particle Physics and Astrophysics at the SLAC National Accelerator

Laboratory and the Kavli Institute for Particle Astrophysics and Cosmology. At SLAC, he co-leads the liquid nobles group, which is a major participant in the LUX-ZEPLIN dark matter search.

October 26, 2017

4:30 p.m.
Rashid Auditorium
Gates-Hillman Centers
Carnegie Mellon University
Free and open to the public

Abstract: Dark matter remains a profound mystery at the intersection of particle physics, astrophysics and cosmology. While searches have made significant progress, particularly for dark matter in the form of Weakly Interacting Massive Particles (WIMPs), dark matter has so far been observed solely through its gravitational effects. After surveying the cosmological and astrophysical underpinnings of dark matter, Akerib will discuss the experimental challenges of reaching the required level of sensitivity and background rejection when searching for WIMPs, which are being addressed in the LUX and LUX-ZEPLIN (LZ) experiments. LUX, the Large Underground Xenon experiment, used 250 kg of liquefied xenon as a WIMP target. In the coming years, LZ, the next generation experiment with a 7-ton target, will be installed in LUX's place in the former Homestake gold mine in South Dakota. Akerib will report on the LUX results, building LZ and conquering the technical challenges along the way.