



PHYSICS AND ASTRONOMY SEMINAR

Dr. Carsten Krauss

Department of Physics-Centre for Particle Physics
University of Alberta

“Status and recent results from the PICO dark matter search”

Abstract

Direct dark matter searches have been going on in underground locations around the world for many years. Great progress has been made in the technology to search for rare interactions with both noble liquids and superheated liquids. These two types of dark matter target materials currently have the best sensitivity for spin independent interaction and spin dependent interactions, respectively. The PICO collaboration has specialized on building and operating large dark matter bubble chambers filled with fluorine rich refrigerants as active liquid. These liquids provide excellent sensitivity to detecting interactions between WIMP dark matter and protons due to the large nuclear spin enhancement in fluorine.

The PICO collaboration has operated bubble chambers of increasing size in at SNOLAB over the past 5 years. In 2012 PICO formed as the merger of the Canadian PICASSO and the US COUPP experiment. In 2015 the results of the first 2 litre dark matter bubble chamber that was background free during operation was published. This year, the result of the larger PICO60 chamber was published which improved the world's best limit on WIMP proton interactions by a factor of 17. Next year the PICO 40L detector will start operating, which incorporates a new detector concept aimed at reducing backgrounds even further. In the coming years PICO 500 will be constructed to push the sensitivity to WIMP interactions with protons down significantly once more.

Tuesday, September 26, 2017

10:00 a.m.

Clearihue Building

Room C115