Calgary Sigma Xi Seminar Series

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Presents:

Testing fundamental physics with antihydrogen at CERN

by

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Thursday, November 26th 2020, 5 pm

Location: Zoom

https://ucalgary.zoom.us/j/95048506487 **Meeting ID**: 950 4850 6487 **Passcode**: antiH-4u

Abstract: Based on our current understanding of particle physics, the Big Bang should have produced equal amounts of matter and antimatter. However, if this were the case each matter particle would meet its antimatter counterpart and annihilate leaving a universe full of energy without matter. Clearly, some matter managed to survive to create the universe we see today but the reason why remains one of the biggest mysteries in physics. At the CERN research centre on the border of France and Switzerland, several collaborations are attempting to learn more about antimatter and test the symmetry between matter and antimatter by studying the antihydrogen atom, the bound state of an antiproton and a positron. Experiments with antihydrogen are a natural way to test matter-antimatter symmetry because antihydrogen's matter counterpart, hydrogen, is one of the best studied systems in physics. This talk will discuss the status and progress of the ALPHA (Antihydrogen Laser PHsyics Apparatus) antihydrogen experiment at CERN. ALPHA has made major progress in recent years with studying the spectrum of antihydrogen and has recently constructed a new apparatus for measuring the free-fall of antimatter known as ALPHA-g.

Bio: Tim Friesen has been studying antimatter and antihydrogen for more than 10 years, starting as a PhD student at the University of Calgary (completed 2014). Following his PhD he moved to Geneva, Switzerland to work full-time on the ALPHA experiment at CERN on the border of France and Switzerland. In 2018, Tim rejoined the University of Calgary as an Assistant Professor in the Department of Physics and Astronomy and continues his work with ALPHA with a focus on microwave experiments with antihydrogen and non-neutral plasmas.

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We also wish to acknowledge the University of Calgary for providing the Zoom capabilities