Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Demonstration of laser cooling of antihydrogen and its applications in precision antimatter experiments.[1] MAKOTO FUJIWARA, TRIUMF, TAKAMASA MOMOSE, University of British Columbia , ANDREA CAPRA, TRIUMF, ROBERT COLLISTER, TRIUMF / University of British Columbia, TIMOTHY FRIESEN, University of Calgary, DAVID GILL, TRIUMF, ADREW EVANS, University of Calgary, MICHAEL HAYDEN, Simon Fraser University, ALEXANDER KHRAMOV, British Columbia Institute of Technology / TRIUMF, SCOTT MENARY, York University, MARIO MICHAN, TRIUMF / University of British Columbia, ART OLIN, CHKUMAN SO, TRIUMF, ROBERT THOMPSON, University of Calgary — Laser cooling is a technique which has revolutionized atom physics in the past 40 years, and is the basis of many of modern experiments in the field. However, until now, it has never been applied to an antimatter system. Here, we report the first demonstration of laser cooling of antihydrogen, the simplest form of atomic antimatter. By driving the 1S-2P transition in antihydrogen via pulsed Lyman-alpha radiation at 121 nm, we have performed Doppler cooling of magnetically trapped antihydrogen in the ALPHA experiment at CERN. In this talk, we will present preliminary results on our first laser cooling experiment. Furthermore, we will discuss far-reaching implications of the laser cooling technique in antimatter physics, and entirely new class of precision tools it will enable. These include anti-atomic fountains and anti-atom interferometers.

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Date submitted: 30 Jan 2020 Electronic form version 1.4