

# Anti-Hydrogen Detection and Background Rejection for ALPHA-g

*Saturday, 18 February 2023 09:30 (15 minutes)*

Antimatter lies at the heart of many of the universe's unanswered questions, but direct study of antimatter structures is technically difficult. ALPHA-g promises the first direct free-fall observation of the Earth's gravitational force acting on anti-atoms, by precisely recording the annihilation positions of anti-hydrogen atoms after a controlled release from a magnetic trap. Reconstructing these annihilations is a unique challenge requiring a specialized detector system. Furthermore, due to low antihydrogen yield and the slow release timescale, the cosmic ray background provides an additional obstacle which requires a secondary detector system to overcome. I describe the implementation of the ALPHA-g time projection chamber and "barrel scintillator" cosmic ray veto, and showcase their ability to meet these goals.

## Supervisor

Makoto Fujiwara

## Funding Agency

NSERC

## Supervisor Email

fujiwara@triumf.ca

## Your Email

gsmith@triumf.ca

**Primary author:** SMITH, Gareth (UBC/TRIUMF)

**Presenter:** SMITH, Gareth (UBC/TRIUMF)

**Session Classification:** February 18 Morning Session

**Track Classification:** Particle Physics