

# Upgrades at the TITAN Penning Trap for Tests of the Standard Model

*Thursday, 15 February 2024 21:00 (15 minutes)*

Among the most stringent tests of the Standard Model are performed through precision experiments of beta decay. In these tests, a crucial input is the  $Q$ -value or the mass difference of the mother and daughter nuclides. This extraordinary precision can only be achieved with a Penning trap mass spectrometer. The spectrometer at TITAN-TRIUMF has been a pioneer in the use of highly charged ions to boost the precision and to reduce systematics through e.g. beam purification. For further enhancement of the achievable precision at TITAN, two upgrades have been implemented: First, the trap itself has been made cryogenic to extend the interrogation type of the highly charged ions and therefore to improve the precision. Second, a new phase-based technique to determine the cyclotron frequency is being implemented. The status of the Penning trap and its impact on the achievable precision in determining the relevant  $Q$ -values will be presented.

## Your Email

aweaver@triumf.ca

## Supervisor

Ania Kwiatkowski

## Supervisor Email

aniak@triumf.ca

## Affiliation

TRIUMF

## Your current academic level,

Postdoctoral fellow

**Primary author:** Dr WEAVER, Andrew (TRIUMF)

**Co-authors:** Prof. KWIATKOWSKI, Ania (TRIUMF/University of Victoria); Ms CZIHALLY, Annabelle (TRIUMF); Dr LYKIARDOPOULOU, Marilena (TRIUMF); Ms KAKKAR, Sakshi (TRIUMF/University of Manitoba)

**Presenter:** Dr WEAVER, Andrew (TRIUMF)

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