

Abstract Submitted  
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**Design and Operation of a Penning Ion Trap Source for the CHIP-TRAP Mass Spectrometer**<sup>1</sup> MADHAWA HORANA GAMAGE, NADEESHA GAMAGE, RAMESH BHANDARI, MATTHEW REDSHAW, Central Michigan University — In this presentation, I will discuss the design and operation of a Penning Ion Trap (PIT) source that we have developed at Central Michigan University (CMU). It is similar to in concept to a PIG source, but produces small bunches of  $\sim 100$ s to  $1000$ s of ions from minimal gas samples in short duration ( $\sim 1$   $\mu$ s) pulses. It is comprised of a cylindrical trap structure consisting of a ring and two end caps, inside a 0.55 T permanent neodymium ring magnet with a trap volume of about  $0.8$   $\text{cm}^3$ . Ions are produced by electron impact ionization of gas admitted into the trap via a precision leak valve using a  $\sim 1$   $\mu\text{A}$  electron beam from a thermal emitter applied for typically 1 ms. Ions produced within the trapping region are automatically confined and stored for a period of typically 5 ms before being released from the trap by lowering the voltage on one of the end caps in about 250 ns. The PIT source is incorporated into the CMU High Precision Penning Trap (CHIP-TRAP) mass spectrometer that we are currently developing at CMU. CHIP-TRAP aims to perform measurements on stable and long-lived radioactive isotopes, some of which will be supplied by the PIT source.

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