

CPT Calibration Guidelines

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Author:

E. Valtonen

Aboa Space Research Oy
FIN-20014 Turun yliopisto
Finland

Abstract

The guidelines for CPT calibrations are presented. The calibration programme consists of measurements with radioactive sources and particle accelerators, and with electrical equipment and cosmic rays both on ground and in space. As the result of the calibration programme, a transformation matrix is obtained, which is used to interpret the data collected by the instrument during flight.

The basic contributions to the transformation matrix come from the calibrations carried out by using radioactive sources and particle accelerators. The difficult topic of low-energy electron response will be studied by using various radioactive sources. Accelerator runs, on the other hand, will be used for detailed characterisation of CPT over wide energy ranges of electrons, protons, and heavier ions.

Electrical calibrations on ground are used to verify the designed performance of the electronics of the instrument, and to determine the necessary final adjustments of the electronics in order to reach the designed response. In-flight calibrations are required to ensure that the pre-flight functions and performance are maintained during flight, and to provide the data for possible adjustments of the response matrix.

The primary accelerator facilities planned to be used for CPT calibrations have been identified. Two of these, the University of Jyväskylä cyclotron and the University of Gent linear accelerator cover most of the operational energy ranges of CPT for protons and heavier ions, and for electrons, respectively. Access to these facilities for calibrations runs of CPT is considered secured. Other facilities, covering the remaining parts of the energy ranges, have also been identified.