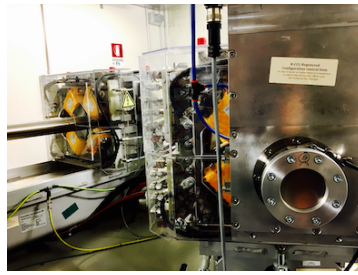


## 1st Workshop - Trento Proton Beam Line Facility



Contribution ID: 21

Type: **not specified**

### Lidal calibration at TIFPA proton beam line

*Monday, 9 November 2020 15:05 (10 minutes)*

LIDAL is a detector designed to study the radiation flux and energy spectra in Low Earth Orbit, it is onboard the International Space Station (ISS) since January 2020. It has been developed coupling a TOF system, based on fast plastic scintillators read by PMTs, with the ALTEA subsystem, a series of silicon detector telescopes which already operated on the ISS between 2006 and 2012 (Zaconte et al., 2010). This configuration adds Time of Flight measuring capabilities and sensitivity to Low Z ions to the energy loss measurements performed by the silicon strip detectors.

In this talk we will show results from LIDAL calibration and characterization, with protons at 220 MeV, 169 MeV and 91 MeV, that was conducted in June 2019 at TIFPA proton beam line. These results are going to be used to assess flight data that are continuously recorded on the ISS since January 2020.

We will show the time of flight distribution which yield to a time resolution ranging from 70 to 90 ps, and the comparison of the measured time of flight with the expected values.

For those particles which  $DE/Dx$  is above threshold in the silicon detector system we will present the measured energy loss spectra and its comparison with expected values.

Then we will demonstrate tracking capabilities of the device, from both the silicon detectors and the TOF subsystem.

Particle discrimination will be achieved by combining TOF and LET measurements. LIDAL is in this way the first detector in operation on-board the ISS capable of measuring all the characteristics of cosmic radiation relevant in the definition of biological risks for astronauts.

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**Session Classification:** Space Applications