



Contribution ID: 24

Type: **not specified**

Qualification of microstrip silicon sensors @ TIFPA proton beam.

Monday, 9 November 2020 10:45 (10 minutes)

The proton beam available through TIFPA at Adrontherapy Center in Trento has been used in the past years to characterize the Silicon Microstrip prototypes for the FOOT experiment.

The FOOT (FragmentatiOn Of Target) experiment has a tracking subsystem, the MSD (Microstrip Silicon Detector), featuring three x-y coordinate measuring planes, each of which composed by two single-sided silicon microstrip sensor, arranged orthogonally one respect to the other. In order to study if the pairing of the thin sensor (150 micrometers thick) and the front-end readout chip (VA1140) would fulfil the requirements, several test beam campaigns were carried out in the past three years. Several beam energies and settings were used to characterize the prototypes. The outcome validated the proposed technical solutions and will be presented.

A second series of tests were also performed to validate a novel “grazing angle” approach for microstrip sensors, technique up to now tested only for pixel detector. In fact, using a proton beam impinging at different angles on the sensor surface it is possible to vary the actual energy deposited into the detector increasing the track length and also varying its fraction below a given strip. It is then possible to test the readout electronics saturation without actually having to use higher Z ions, as usually needed with the standard technique. Some preliminary results about these tests will be also presented.

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Session Classification: Detectors - Second Session