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Measurements on capacitance mitigation approaches for LGAD Si-microstrip tracking devices

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In the context of the Pentadimensional Tracking Space Detector project (PTSD), we are currently developing a demonstrator to increase the Technological Readiness Level of LGAD Si-microstrip tracking detectors for applications in space-borne instruments. Low Gain Avalanche Diodes (LGAD) is a consolidated technology developed for particle detectors at colliders which allows for simultaneous and accurate time (<100 ps) and position ($^{\sim}$ 10 µm) resolutions with segmented Si sensors. It is a candidate technology that could enable for the first time 5D tracking (position, charge, and time) in space using LGAD Si-microstrip tracking systems. The intrinsic gain of LGAD sensors may also allow to decrease the sensor thickness while achieving signal yields similar to those of Si-microstrips currently operated in Space.

Mitigation of the device input capacitance to the readout electronics must be assessed to achieve the required timing resolution with long LGAD Si-microstrip devices. In this contribution we discuss the ongoing laboratory measurements on a breadboard model for verification of requirements, functionalities and space qualification of LGAD Si-microstrip devices for 5D tracking in space, with details about device capacitance mitigation approaches.

Eligibility for "Best presentation for young researcher" or "Best poster for young researcher" prize

Yes

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