



UNIVERSITÀ
DI TRENTO

Dipartimento di
Fisica



PhD Program in Space Science and Technology - SST

Low Gain Avalanche Diodes and Their Applications

Specific Seminar – Curriculum 5

June 12, 2024, 3 p.m.

Speaker:

Dr. Matteo Centis Vignali – Fondazione Bruno Kessler

Abstract:

Low Gain Avalanche Diodes (LGADs) are silicon sensors employing charge multiplication to achieve a charge gain in the order of 10. The initial development of these sensors was spurred by the High Luminosity upgrade of the Large Hadron Collider (LHC), where these sensors will be used to measure the time of arrival of minimum ionizing particles with a precision of about 30 ps.

To achieve this performance, LGADs improve the signal-to-noise ratio (SNR) of the detector system due to their gain and have been engineered to withstand the harsh radiation environment of the LHC experiments.

A feature of the first implementation of LGADs is the presence of areas without gain between the readout channels, reducing the fill factor of the devices.

Different technological solutions were explored to improve the LGAD fill factor, resulting in different sensor structures.

LGAD sensors are finding applications outside high energy physics due to their time resolution for charged particles and improved SNR.

This seminar summarizes the working principles of LGAD sensors and the features of their different technological implementations. Examples of the application of these sensors in the fields of high energy physics, synchrotron radiation, and space-borne experiments will be explored.

Online attendance:

<https://infn-it.zoom.us/j/94981588544?pwd=S0R1VnEyTmdhREhrV0kzbzRGUEd3Zz09>

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