



Contribution ID: 89

Type: **Parallel session talk**

Stress Tests on Low Gain Avalanche Diodes and AC-coupled Low Gain Avalanche Diodes

Wednesday 8 October 2025 14:40 (20 minutes)

Devices with internal gain, such as Low Gain Avalanche Diodes (LGADs), demonstrate O(30) ps timing resolution, and they play a crucial role in High Energy Physics (HEP) experiments, among other applications. Similarly, resistive silicon devices, such as AC-coupled Low Gain Avalanche Diodes (AC-LGADs) sensors, achieve a fine spatial resolution while maintaining the LGAD's timing resolution. However, their performance is strongly affected by environmental factors such as temperature, humidity, and storage conditions. The challenging operating conditions in space impose challenging constraints on the operational performance, against temperature fluctuations, for example. Therefore, devices with different depletion layers and implantation characteristics are tested. A systematic evaluation of the response of these sensors as a function of these environmental parameters is therefore of essential importance when accounting for any application. The precise characterization of resistive silicon devices is experimentally challenging because of the capacitively coupled correlated degrees of freedom involved in the readout. (AC-)LGAD sensors fabricated at the Brookhaven National Laboratory (BNL, US) are characterized at the Silicon Laboratories at BNL, at Brown University, and the RD50/DRD3 facilities at CERN. They are stress-tested against various operating conditions. Previous studies have focused primarily on the electrical characterization of LGAD; now, we focus on the environmental resilience of AC-LGADs and on the signal characterization when ionizing radiation hits those devices.

Authors: BARONE, Gaetano (Brown University); WANG, Lixing (Brown University); RUSSELL, Trevor (Brown University)

Presenter: RUSSELL, Trevor (Brown University)

Session Classification: SHARED SESSION

Track Classification: RDC 3 Solid State Tracking