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Studies of the Performance of Radiatino Hard GaAs Photodetectors JOSEPH GOODELL, University of Virginia, CMS COLLABORATION — Gallium Arsenide (GaAs) photodetectors are a type of semiconducting photodetector that should be able to withstand much higher levels of radiation than commonly used silicon photomultipliers (SIPMs). At the University of Virginia we are characterizing GaAs devices as compared to SIPMs by studying the I/V curve in breakdown region, the breakdown voltage, dark noise, and response to photons. Measurements of single photon avalanche diodes (SPADs) and PMC (multiple SPAD chips) are being made focusing on the breakdown region for hardness tests. The SPADs and PMCs will be exposed to high levels of radiation in test beam environments so that post-irradiation performance can be characterized as well. Ultimately GaAs photodetectors could prove to be effective radiation-hard detectors with applications in high radiation environments like those found at the upgraded high-luminosity Large Hadron Collider (LHC).

> Joseph Goodell University of Virginia

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