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Analog SiPM R&D for High Energy Physics

Silicon PhotoMultipliers (SiPMs) are a promising technology as innovative photodetectors for future high-energy particle-physics experiment, given their fast time response, small dimensions and high photo-detection efficiency. Possible applications are in the Ring Imaging Cherenkov Detectors which are fundamental systems for particle identification. In this field of application, the main drawback of SiPMs is related to radiation damage which provokes a large increase in the dark current rate (DCR) of the sensors and thus requires mitigation strategies such as the cooling at low temperatures and the in-situ annealing to allow operation in very harsh environment. An extensive test campaign is ongoing to measure SiPM performances as a function of many parameters such as the temperature, the operating conditions and the irradiation level. Results of I-V curves, Gain, DCR and Time Resolution, as a function of the over-voltage, temperature and for few irradiation steps, will be presented for some commercially available SiPMs.

Title

Topic

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Classification de Session: Photodetectors