

Characterization of cryogenic SiPM down to 6.5 K

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SiPM operation at very low temperatures has the potential to improve detector systems for experiments at cryogenic temperatures. We characterised electrical and optical properties of a commercially available cryogenic SiPM over a temperature range from 6.5 K to 286 K, such as breakdown voltage, quenching resistance, gain, waveform shape, photon detection efficiency and dark count rate. We observed a non-linear temperature dependence of the breakdown voltage and the small change of the waveform shape at low temperatures. The SiPM gain and maximum allowed overvoltage decrease at low temperatures, however, stable operation down to 6.5 K has been demonstrated. Furthermore, the feasibility of assembling a detector with a plastic scintillator was studied.

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