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Overview on Experimental Setups to Study SiPM Parameters Down to Cryogenic Temperature

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Many important SiPM parameters, like breakdown voltage, signal shape, gain, dark count rate, afterpulses probability present significant temperature variations. Therefore, a study of these parameters in a wide temperature range, down to cryogenic temperatures allows to have a closer look to the physical phenomena staying behind this temperature dependence and eventually find equivalent operating conditions independent of temperature. Moreover, since some different physical phenomena's which lead to same SiPM parameter, but may show different variation with temperature. Therefore, studies of those physical phenomena's as a function of temperature may be only the way to separate them and find the dominated one.

This work reports the overview on experimental set-ups developed for studies of SiPM parameters as a function of temperature. Moreover, it should lead to guide line for future scientists who would like to build their set-ups for temperature studies. Work includes practical suggestions in design, calibration and usage of such kind of set-ups, which was collected by authors during building their own facilities.

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