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A digital SiPM in liquid xenon

The currently most competitive direct dark matter detection experiments are liquid xenon time projection chambers (LXe TPCs) usually instrumented with PMTs. In the search for alternatives to those PMTs, a digital SiPM sensor has been developed, where the digitization happens directly on the chip. Digital SiPMs show dark count rates comparable to that of PMTs, with the added benefit of not needing analog to digital converters and greatly reduced data rates.

For the first time, one digital SiPM has been immersed and operated in cryogenic LXe. We present the results of this test, which allowed to measure some of the characteristics of this prototype, such as its dark count rate at different temperatures and its photon detection efficiency. The test shows the potential of such sensor for future liquid xenon experiments.

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