SiPM and related cryogenic electronics challenges and breakthroughs

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SiPMs are presently used in a wide field of applications, including particle and nuclear physics, medical applications and automotive, a segment that has been experiencing a fast growth in the last years.

The immunity to the magnetic field, the relatively low cost and the possibility of a customized size, make SiPMs a valid alternative to the traditional Photomultipliers (PMTs).

The Bruno Kessler Foundation (FBK) has been producing SiPMs since several years and developed different type of them, sensitive to different wavelengths and with low dark count rate.

The Darkside experiment at LNGS aims at direct dark matter search using a 40 tonnes Liquid Argon TPC, instrumented with more than 200,000 SiPMs. Their use at cryogenic temperature requires a dedicated electronics and an appropriate choice of the substrate PCB. The packaging of a large number of SiPMs requires a dedicate facility: the DarkSide strategy and work-flow will be presented.