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Advanced Technologies for Detector Readout in Particle Physics

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Abstract : Given the continuous demand for improved readout performances in particle and dark matter physics, CAEN SpA is pushing on the development of advanced technologies for detector readout. We present the Digitizers 2.0, the result of the success of the previous Digitizers generation, combined with expanded capabilities and a renovation of the user experience introducing the open FPGA. The first product of the family is the VX2740 (64 ch, 125 MS/s, 16 bit) for advanced waveform recording and Digital Pulse Processing, fitting with the special requirements of Dark Matter and Neutrino experiments. In parallel, CAEN is developing the FERS-5200 platform, a Front-End Readout System designed to read out large multi-detector arrays, such as SiPMs, multi-anode PMTs, silicon strip detectors, wire chambers, GEM, gas tubes, and others. This is a highly-scalable distributed platform, based on small Front-End cards synchronized and read out by a concentrator board, allowing to build extremely large experimental setup. We plan to develop a complete family of cost-effective Front-End cards tailored to specific detectors and applications. The first one available is the A5202, a 64-channel unit for SiPM readout based on CITIROC ASIC by Weeroc.

Keywords : dark matter, digitizers, front-end electronics, open FPGA, SiPM
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