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CALICE SiW ECAL - Development and performance of a highly compact digital readout system

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A highly granular silicon-tungsten electromagnetic calorimeter (SiW-ECAL) is the reference design of the ECAL for International Large Detector (ILD) concept, one of the two detector concepts for the detector(s) at the future International Linear Collider. Prototypes for this type of detector are developed within the CALICE Collaboration.

During the last year a highly compact digitial read out card, called SL-Board, has become available. The SL-Board combines data acquisition, power regulation and signal buffering for up to 10000 readout channels on a surface as small as $18 \times 4\,\mathrm{cm}^2$. With this size the systems complies with space constraints in modern particle physics detectors such as ILD. The SL-Board can be readout by a regular computer USB interface via a FTDI Module or through dedicated module, called CORE Module, via a custom developed PCB using UART. The CORE module delivers also the clock and fast commands and synchronises the SL-Boards. The CORE Module acts also as a data concentrator since it receives input from up to 15 calorimeter layers. The entire system SL-Board CORE Module is designed for a data throughput of up to 80 MBit/s.

The system has been used for the first time in a beam test in Summer 2019 at DESY. The contribution will summarise the main features of the system and report on its performance during the beam test

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