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The dRICH data acquisition system for ePIC: a general overview

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The dual-radiator RICH (dRICH) detector of the ePIC experiment at the future Electron-Ion Collider (EIC) will use SiPMs for detecting Cherenkov light. The photodetector will cover a surface of ~3 m² with 3x3 mm² SiPMs, for a total of more than 300k channels to readout and will be the first application of SiPMs with single-photon detection in a high energy physics experiment.
We focus on the ePIC-dRICH data acquisition system starting from the ALCOR chip based front-end electronics up to the FELIX based DAQ system through the custom FPGA boards named RDO (Readout Data Output), which are currently being designed at INFN. A special section will also be dedicated to the DAQ prototypes that have been used up to now to readout 2048 SiPM sensors with particle beams at CERN-PS in May 2024.

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