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Front-end and DAQ electronics for the IDEA drift chamber

The IDEA detector is a general purpose detector designed for experiments at future lepton colliders. The central tracker is based on a drift chamber (DCH) designed to provide an efficient tracking, a high precision momentum measurement and an excellent particle identification by exploiting the application of the cluster counting technique.\\
We present the design and the first prototype of the front-end electronics and the data acquisition (DAQ) system for the DCH readout. The front-end plays an essential role in in the acquisition of the signals from the DCH in order to have an excellent time resolution and, therefore, an excellent spatial resolution. The signals, amplified by a wide bandwidth frontend, are converted from analog to digital with the use of high bandwidth (~1 GHz) FADCs or digitizers and then processed via an FPGA on the DAQ Board. The FPGA has an important role, as it initially acquires all the signals converted, processes them with cluster counting algorithms (aimed also at reducing the data throughput) and finally sends the processed information to a back-end computer via an Ethernet interface.

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