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## **Design, Testing, and Results of the Multi-channel Fermilab CFD Readout ASIC**

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We present the design and performance of the multi-channel Fermilab CFD ASIC (FCFD v1) developed for front-end readout of detectors with fast signals such as LGAD. The FCFD is a candidate readout ASIC for the barrel TOF detector of the ePIC experiment. It includes a specially designed discriminator that makes its response robust against amplitude variations of the signal. The application of the CFD directly in the readout ASIC promises to be more reliable and reduces the need for complicated and potentially time-dependent calibrations of precision timing detectors during their operation. We present measured performance of the FCFD v1 with multi-channel capability using LGAD signals from minimum-ionizing particles produced at the Fermilab testbeam facility. We demonstrate excellent timing performance for DC-LGADs with jitter below 10 ps and stability below 10 ps for signal sizes ranging from 7 to 60 fC. We also discuss measurements and design considerations for its use for AC-LGADs.

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