

# The 8th International Conference on Micro Pattern Gaseous Detectors (MPGD2024)



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## A 512-channel FEE prototype based on the custom ASIC for MPGD

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The Micro-Pattern Gas Detector (MPGD) is widely used in high energy physics experiments due to its good spatial and temporal resolution, high rate capability, cost-effective, and suitability for mass production. The MPGD-based Ring Imaging CHerenkov (RICH) detector is one of the candidates for the barrel part of the Particle Identification Detector (PIDB) at STCF. The total readout channel of the PIDB is 518,400 and the front-end readout electronics will be installed directly behind the detector, requiring a readout electronics with a large number of channels. The prototype design, which includes 16 prototype custom ASICs, achieves a readout of 512 channels on a single board. The functionalities of the readout electronics have been validated and an energy spectrum test has been performed with the RICH detector prototype. The ENC is less than 0.5 fC for all channels and the time resolution is better than 1 ns for a 16 fC signal with 20-pF input capacitance and 100-ns charge collection time, meeting the design requirement.

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