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The Tracking Detector for the P2 Experiment

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The P2 Experiment at the new Mainz Energy-Recovering Superconducting Accelerator (MESA), which is currently under construction in Mainz, will measure the weak mixing angle in elastic electron-proton scattering at low momentum transfer with unprecedented precision.

A key parameter for the analysis, the momentum transfer Q^2, is measured by a tracking detector designed for high rates, radiation hardness, and a low material budget.
It consists of 4 identical modules arranged in two layers, with each module containing two sensor planes, populated with novel HV-Monolithic Active Pixel Sensors glued and wire-bonded on rigid-flex strips.
The mechanical, electrical, and cooling designs have been developed and are currently undergoing testing. For this purpose, a scaled-down prototype has been constructed.
The readout features a radiation-hard frontend built around CERN's lpGBT ASIC and an FPGA-based backend.

The poster presents the design of the tracker and the associated readout electronics.

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