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A tracking detector for the P2 experiment

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The P2 experiment at the new electron accelerator MESA in Mainz aims for a determination of the weak mixing angle at low momentum transfer with unprecedented precision. To this end, the parity violating asymmetry in electron proton scattering is studied with integrating Cherenkov detectors at very high rates of scattered electrons. In order to determine the average momentum transfer and precisely study systematics effects which could lead to false asymmetries, a tracking detector is required. We propose to build such a detector from high-voltage monolithic active pixel sensors (HV-MAPS), which are well suited to deal with the enormous rates of scattered electrons and photons and put a minimum amount of material into the beam path. The poster discusses the challenges of the measurements and the proposed detector and reconstruction solutions.

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