

Hybrid pixel detectors for electron diffraction experiments

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The use of hybrid pixel detectors for electron detection offers several possibilities in terms of optimization of the sensor layer and implementation of advanced on chip logic, but is at the same time limited by the nature of the electron interaction in the sensor layer. We use measurements with the EIGER single photon counting detector and GEANT4 simulations to discuss the current status and future developments of hybrid pixel detectors. By moving from Silicon to a high- Z sensor material such as GaAs or CdTe the initial point spread function due to the electron track length could be improved, and on the ASIC side single event processing with energy and/or time or time of arrival measurements will further aid with determining the entrance point of the electron in the sensor. However, for a dedicated instrument, using a longer camera distance combined with a larger sensor would also improve data quality since the flux per unit area is decreased and by using larger pixels the electron track length is shorter relative to the pixel size.