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Reborn quadrant anode image sensor

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We describe position and time sensitive photon counting microchannel plate detector with improved quadrant anode readout system. The technique relies on a combination of the four planar elements pattern and an additional fifth electrode. The charge cloud induced by the event is split between the electrodes. The measured charge values uniquely define the position of the initial event. Quadrant anode has been first published in 1976 by Lampton and Malina. This anode type was undeservedly forgotten and its potential has been hardly underestimated. Presented approach extends the working spatial range to the whole sensitive area of the microchannel plate surface and demonstrates good linearity over the field of view. The resulting spatial resolution is better than 50 microns over the whole field of view in combination with less than 130 picoseconds temporal resolution for 25 mm detector diameter at count rates up to one million events per second.

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