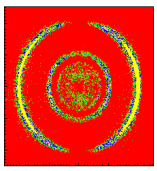
Delay-line detectors with central hole



RoentDek Handels GmbH

Supersonic Gas Jets
Detection Techniques
Data Acquisition Systems
Multifragment Imaging Systems

The **RoentDek HEX80/o** and **HEX120/o** detector geometries have a central hole to allow for a beam passing through the detector centre. Due to the redundancy from having a third delay-line on the HEXanode geometry the active area of an MCP stack can be fully covered (beyond a minimum radius) although the individual delay-line arrays have gaps. On demand, **RoentDek** also produces standard DLDs with a central hole, in which case the anode gaps directly contribute a limited coverage.

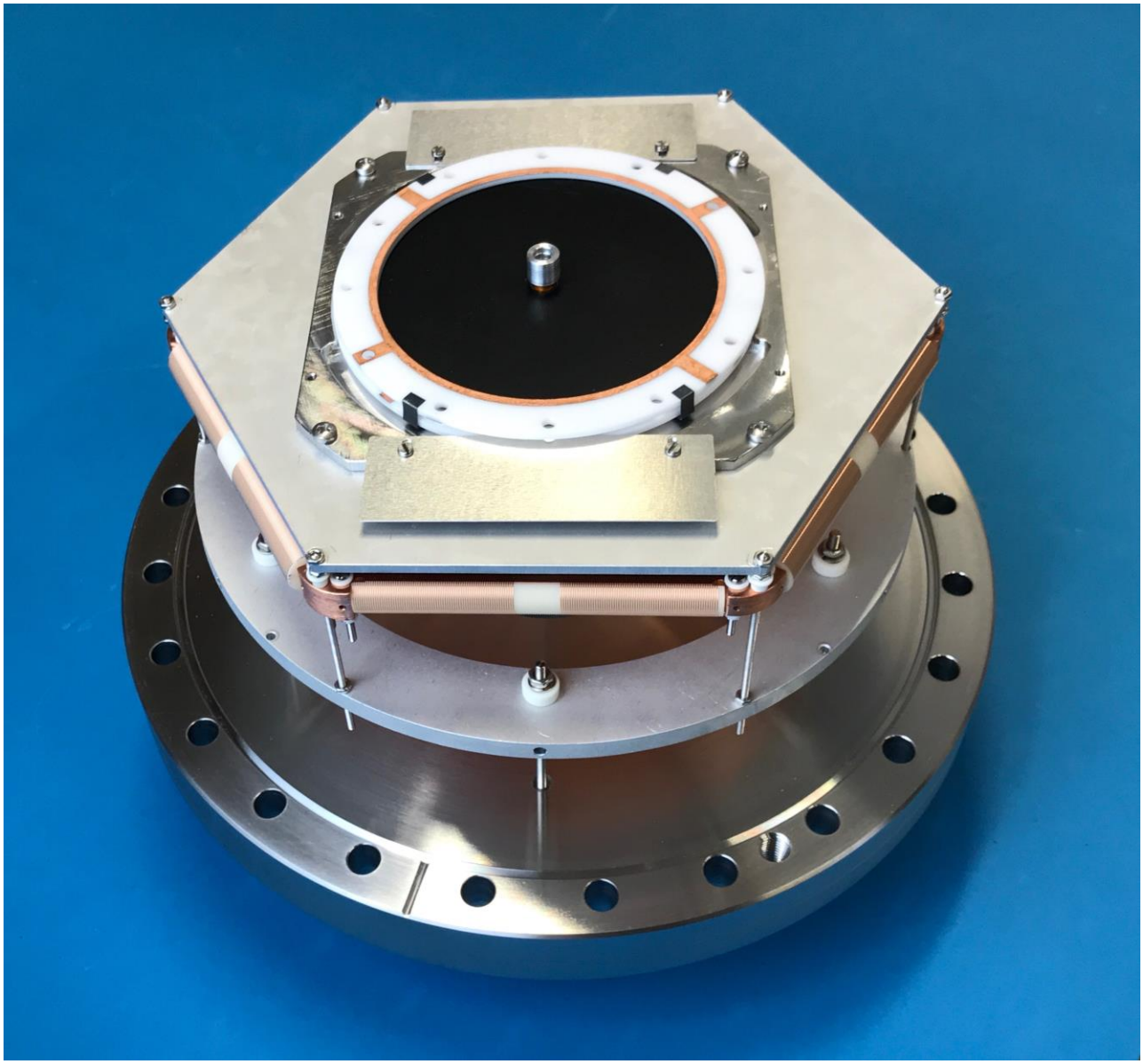
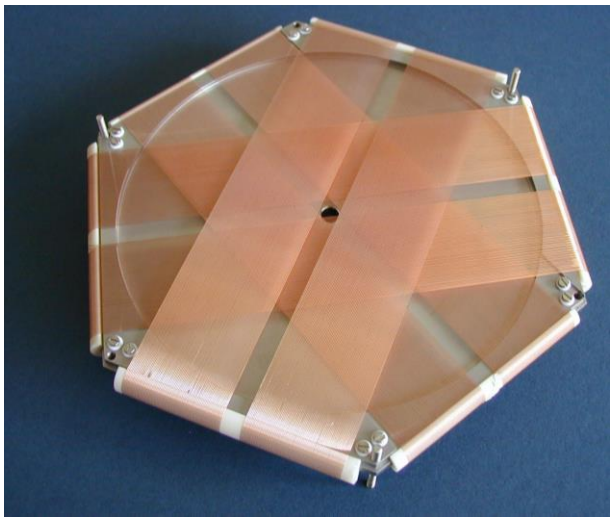


Figure: the **RoentDek HEX80/o** with double tubing through the whole detector, here mounted to a DN200CF support flange with central port and additional ports for signal/bias feedthroughs. The inner tube with 4.5 mm free aperture can be biased independently to allow for a field region at arbitrary potential.

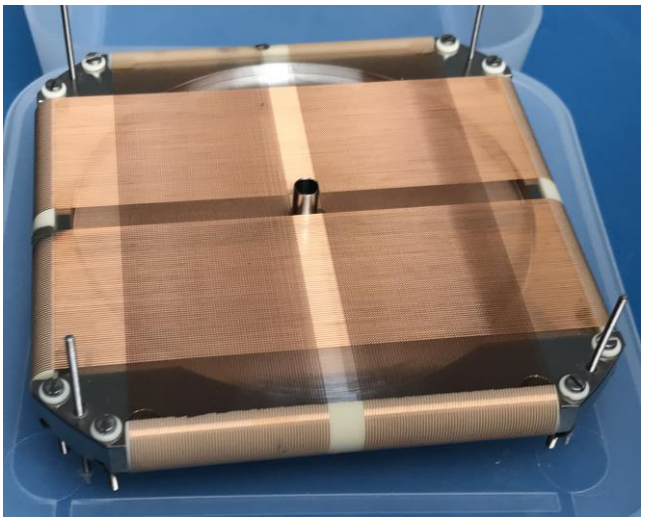
for more information see www.roentdek.com/info/Delay_Line

Custom designs:

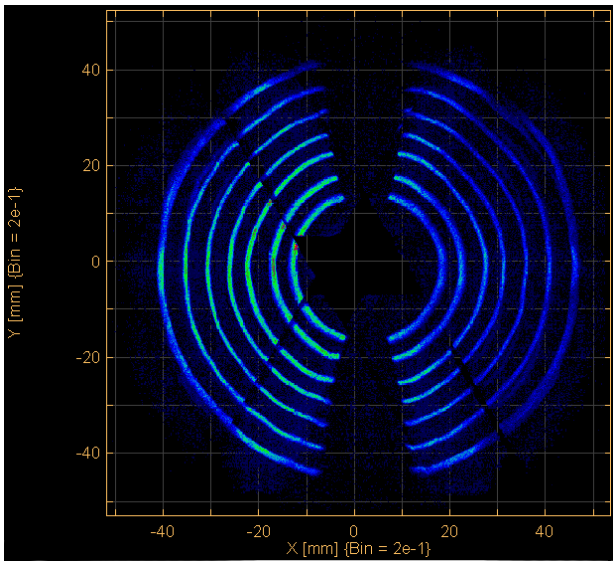
The size of the central free aperture in the anode is variable, a standard size is defined by commercially available micro-channel plates with hole diameter of 6.4 mm. Depending on the application a single or double tubing guided through the hole is required to minimize fringe field effects on the anode side and to additionally provide a field-free path for slow charged particles to pass through the entire detector without disturbing trajectories, furthermore to prevent slow incoming charged particles to be diverted from fringing fields before detection. Depending on the applied potentials and detected particles a mesh placed in front of the detector may further improve flat field response of the detector.



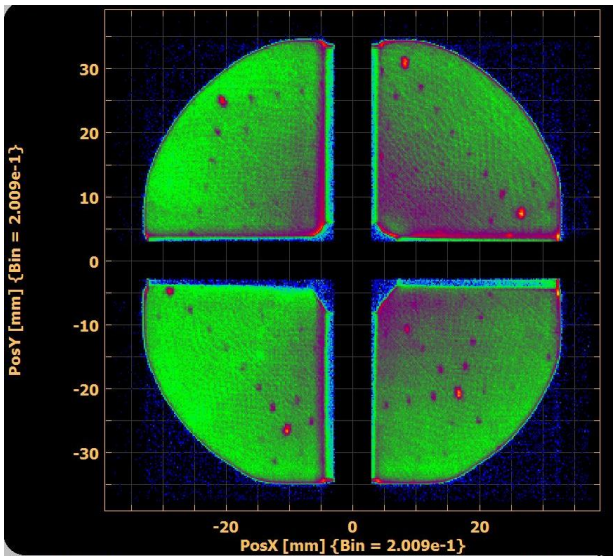
Hexanode with central 8 mm aperture.



*Custom-designed **DL70/o** anode for LEED application.*



*Data from electrons detected by a standard **Hex100/o** placed behind a spherical electron energy analyser (EMS). The gaps in the image are not caused by the anode, see* Yamazaki *et al.*, Rev. Sci. Instr. **88** (2017) 063103



LEED test data (OCI Vacuum Microengineering Inc., http://www.ocivm.com), designed for a low-energy positron diffraction (LEPD) Linac-based system, see Wada *et al.*, e-J. Surf. Sci. Nanotech. **16** (2018) 313

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