

Modification of the target beam dump to include monitor systems

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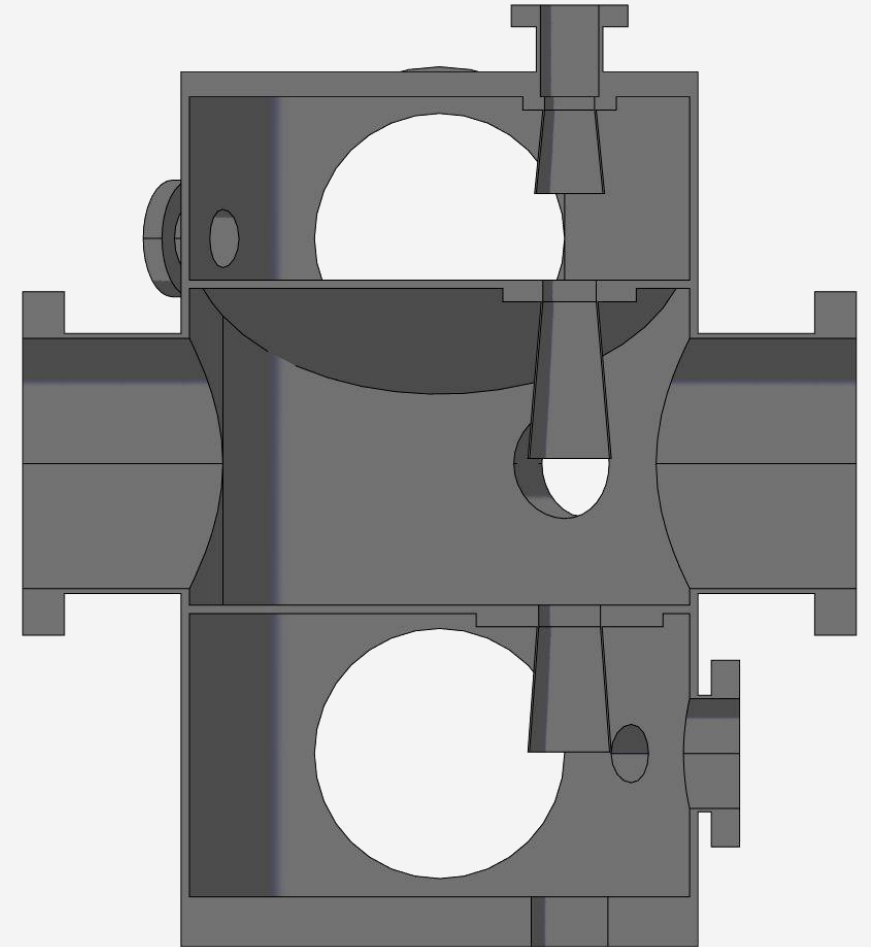
WWU Münster, Institut für Kernphysik, Germany

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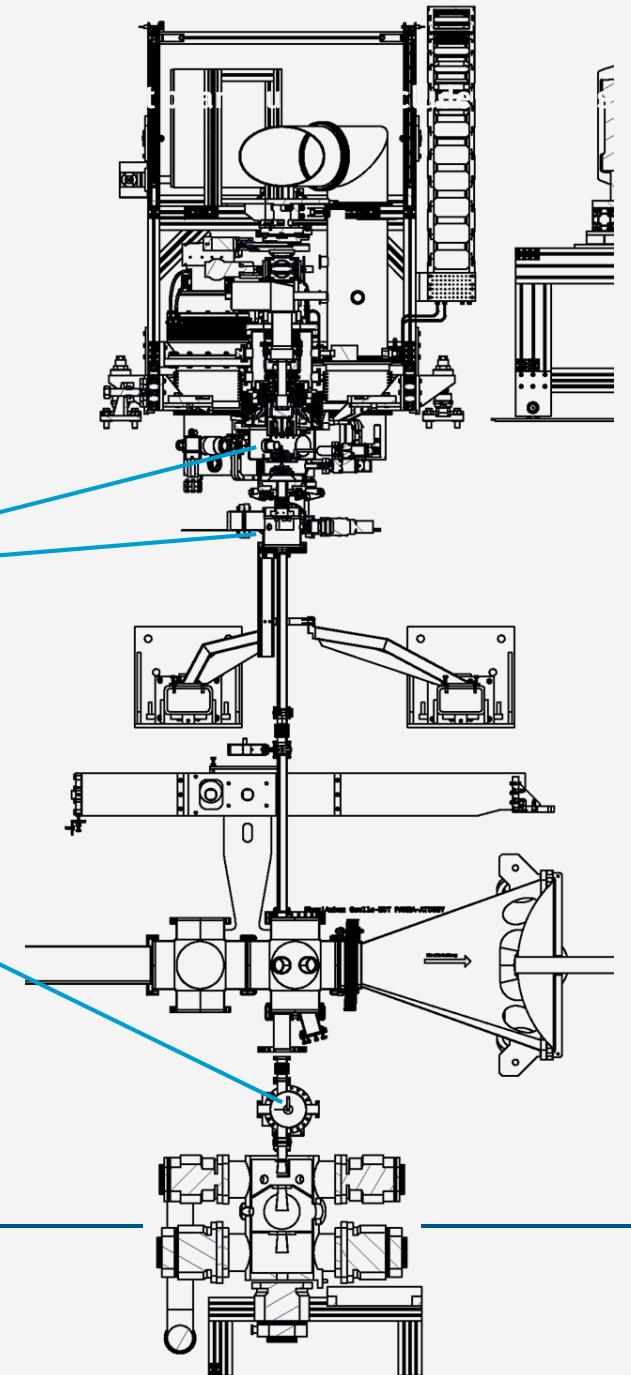
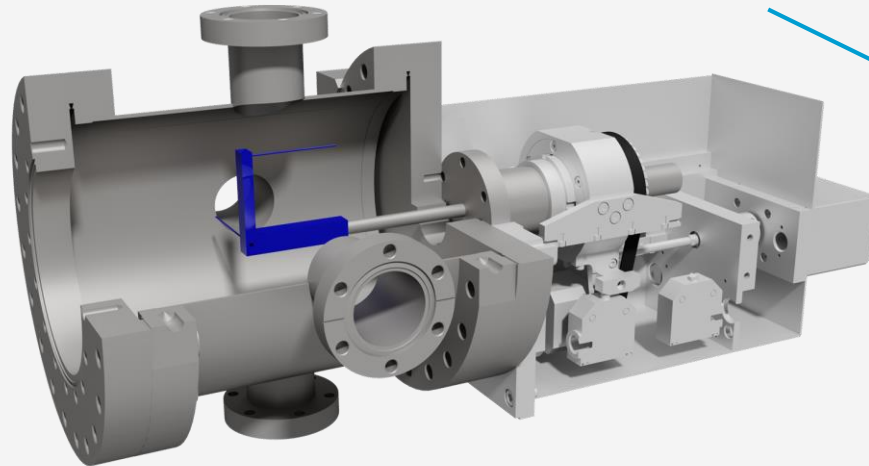
Current situation

- 3-stage beam dump
- 2 turbo pumps at each stage
- 1 turbo pump at bottom
- In routine operation with PANDA cluster-jet target at COSY
- Each stage equipped with pressure gauge
- But no more space for any monitor system



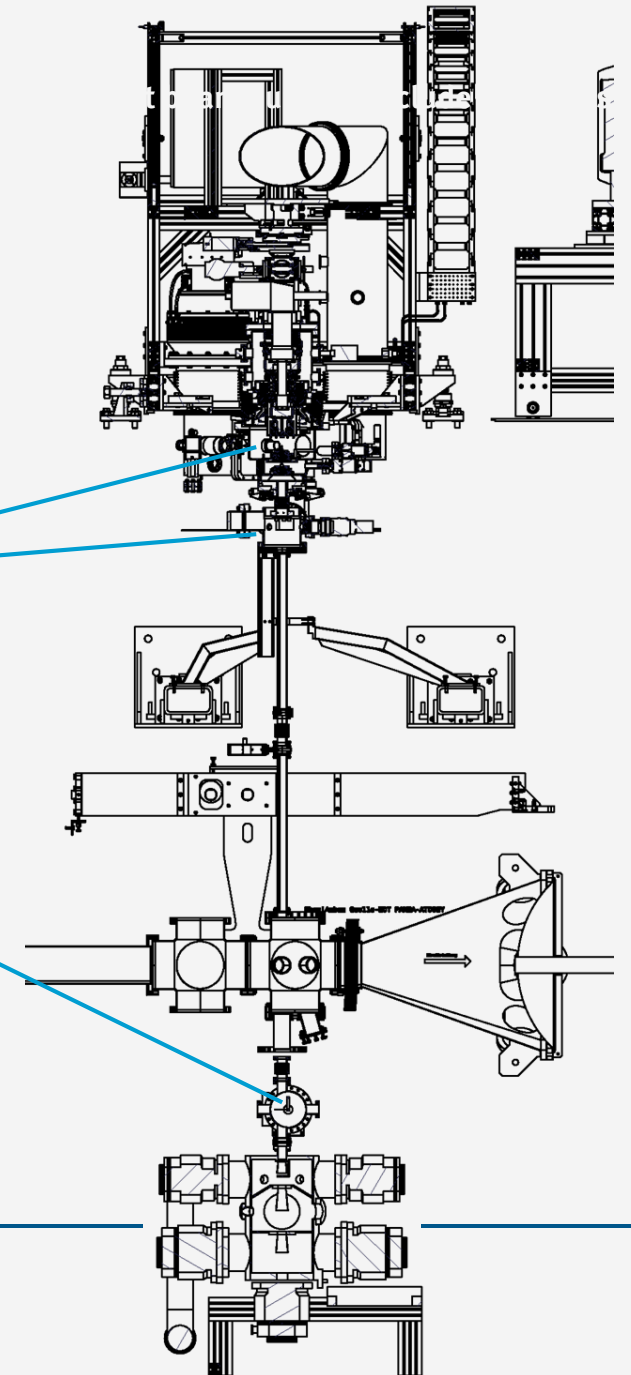
Setup at COSY

- Monitor systems used at COSY:
 - 2 optical monitor systems in skimmer chamber and TVC
 - 1 destructive rod system for absolute thickness determination



Setup at COSY

- Monitor systems used at COSY:
 - 2 optical monitor systems in skimmer chamber and TVC
 - 1 destructive rod system for absolute thickness determination
- Rod system has to be removed at this place at the PANDA experiment
- Monitor systems distributed over the target beam line are crucial for target adjustment and thickness measurement

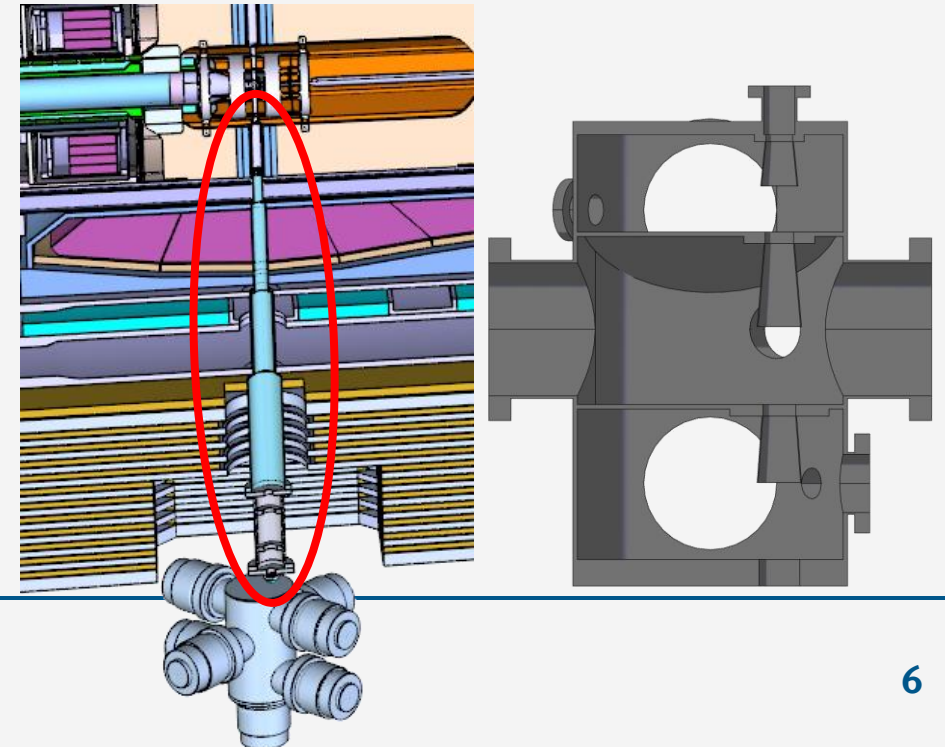
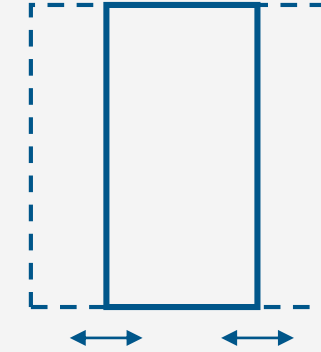


Plans for modified beam dump

- Modular three stage beam dump with sizeable orifices, all existing pumps will be used
 - Fourth stage as alternative for tracking chamber in cluster mode
- Include a rod system to make absolute thickness measurements possible
 - Planned in stage 2
- Include a MCP system to get a 2D live image of the beam
 - Planned in stage 3, in front of the last turbo pump
 - MCP has to be moved out for normal operation, placed on a slide

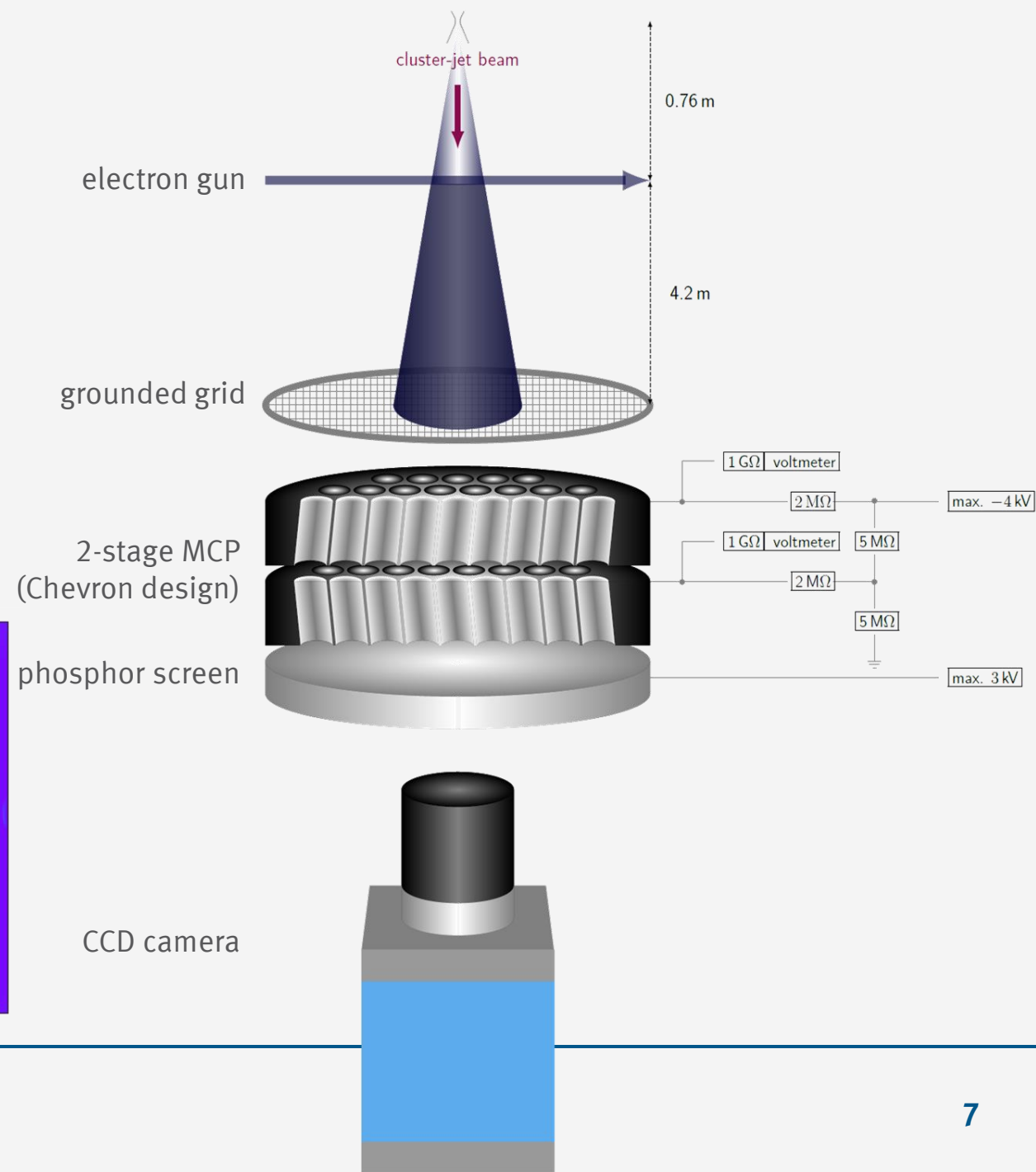
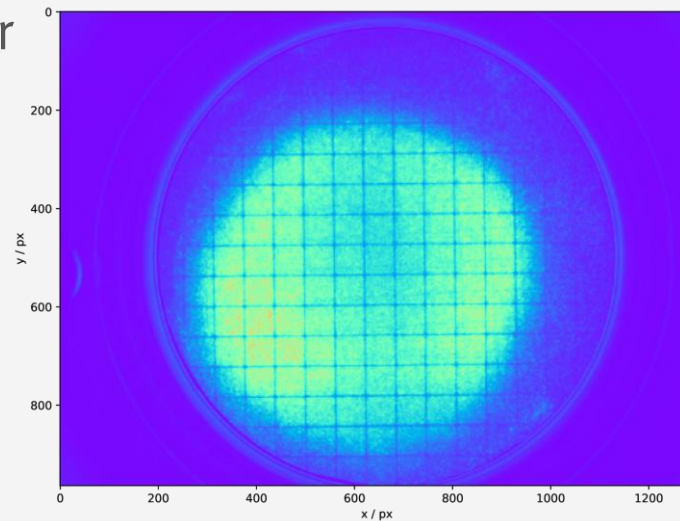
Modular beam dump design

- Modular design with sizeable and movable rectangular orifices to optimize the beam dump for the rectangular beam
- Currently no pumping power between target cross and orifice into the first beam dump stage
- A fourth beam dump stage might be a good alternative for the pellet tracking chamber (only in cluster mode)



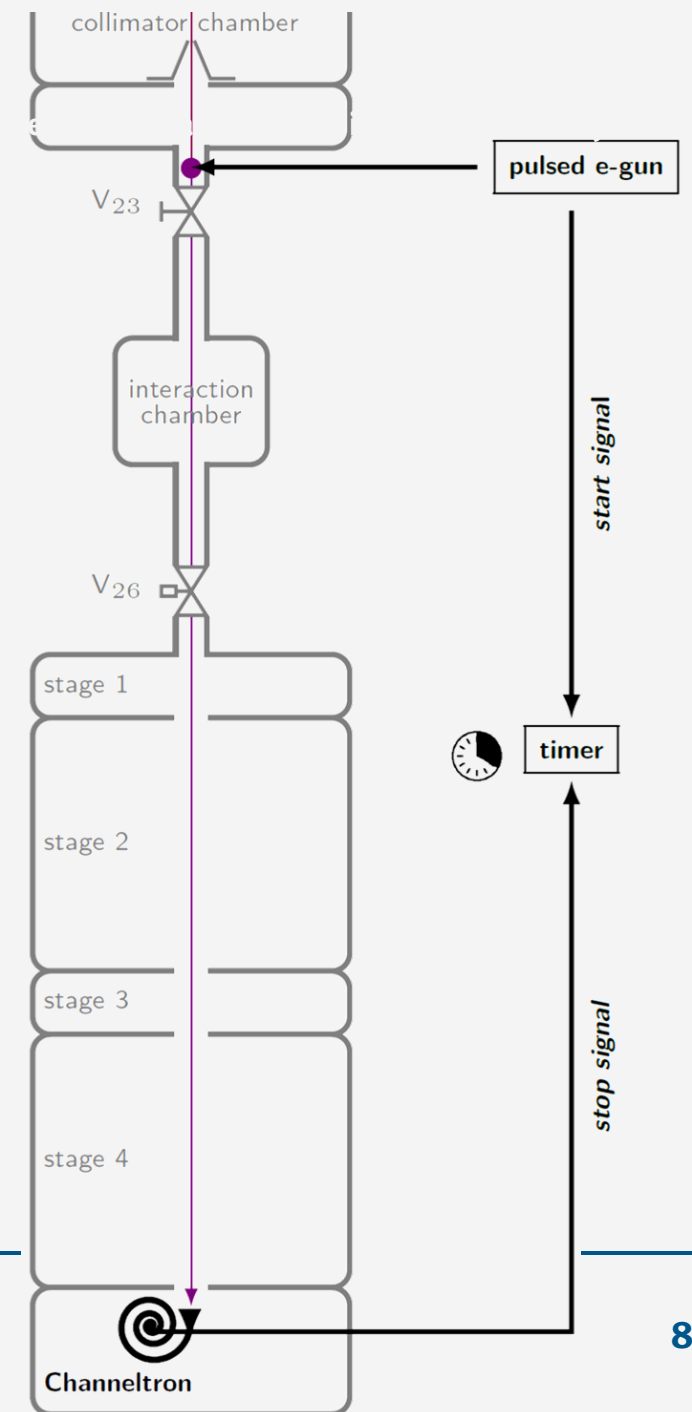
Microchannel plate

- MCP can be used to get 2D image of an ionized cluster beam (doctoral thesis by E. Köhler, 2015)
- MCP system is again in operation at the prototype in Münster



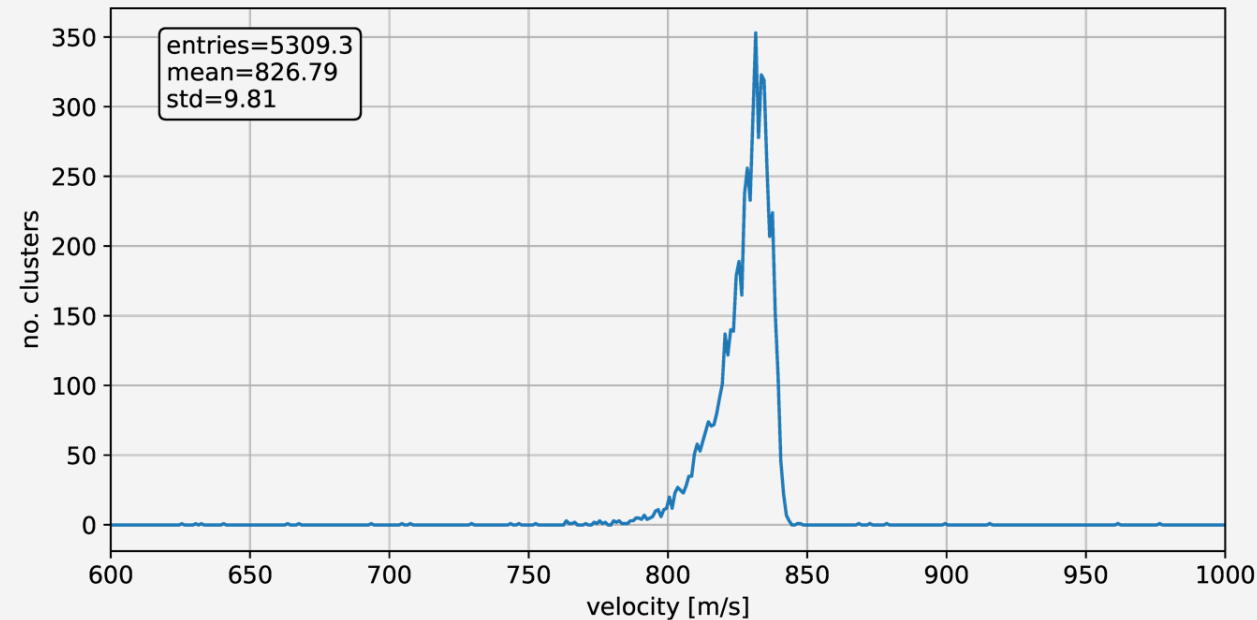
Microchannel plate for TOF measurements

- Cluster velocity is necessary for absolute thickness calculation
- TOF measurements were routinely performed at the prototype with a combination of a pulsed electron gun (start) and a channeltron (stop)
- This also works with a MCP instead of the channeltron (master thesis by S. Vestrick)
 - Allows to include one system for two totally different measurements



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Conclusion

- A new modular beam dump opens several possibilities:
 1. Sizeable orifices can be used to optimize the vacuum conditions
 2. The rod system can be included for thickness measurements
 3. A MCP can be included that allows a 2D visualization of the cluster beam and TOF measurements
- A fourth stage might be a good alternative for the pellet tracking system while the CJT is used

