

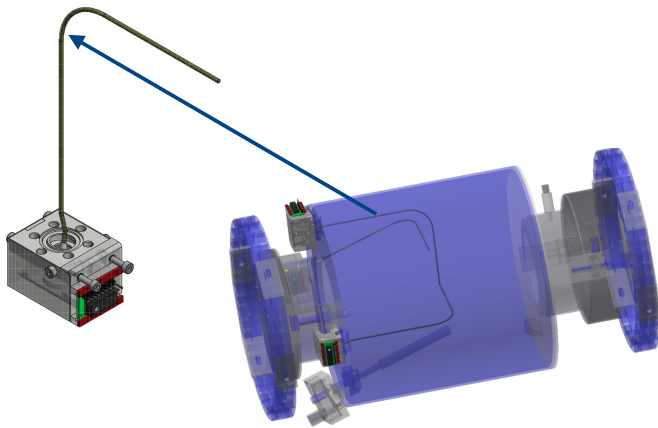
# Investigations of the KATRIN interspectrometer Penning trap

Poster presentation for the XXVIII International  
Conference on Neutrino Physics and Astrophysics

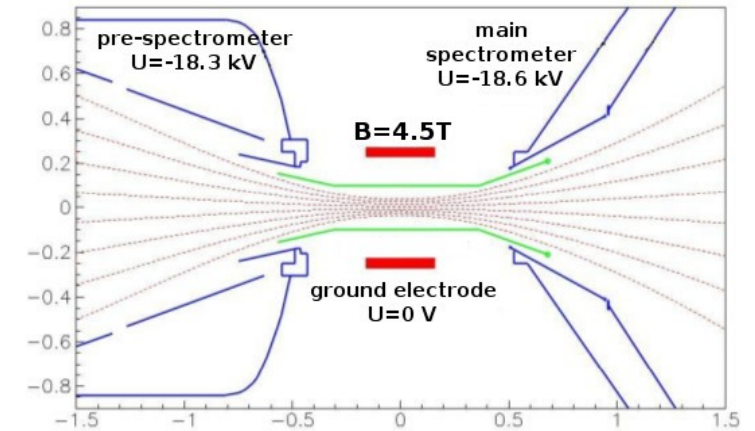


# Interspectrometer Penning trap: Problem and Solution

- Penning trap, which is created in the region between KATRIN pre- and main spectrometers by their high retarding voltages and a high magnetic field of a common superconducting magnet, leads to elevated background rates and produce discharges which can damage parts of the KATRIN spectrometer and detector section.



**Drawing of the wiper system and 3 wipers installed in the valve between pre- and main spectrometers (from H.-W. Ortjohann).**

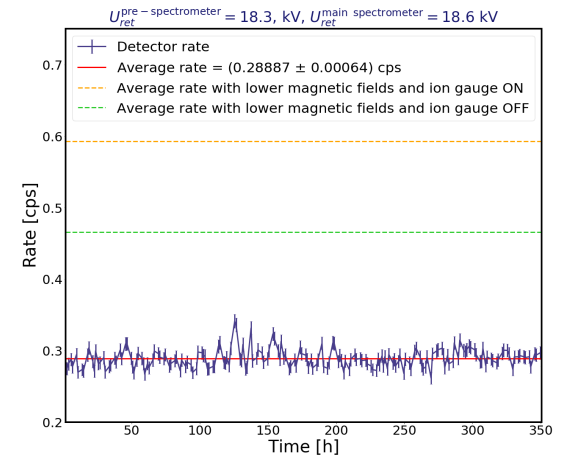
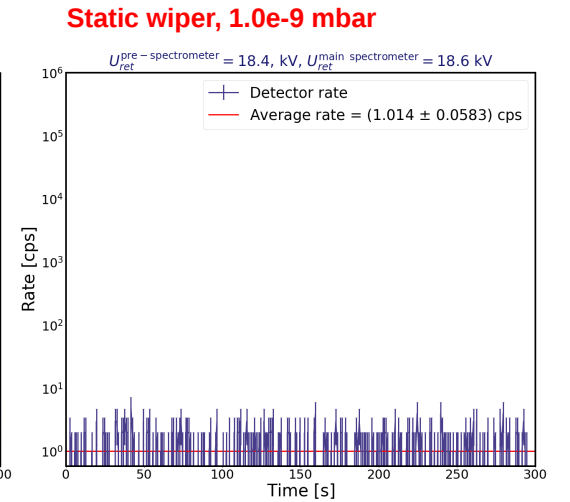
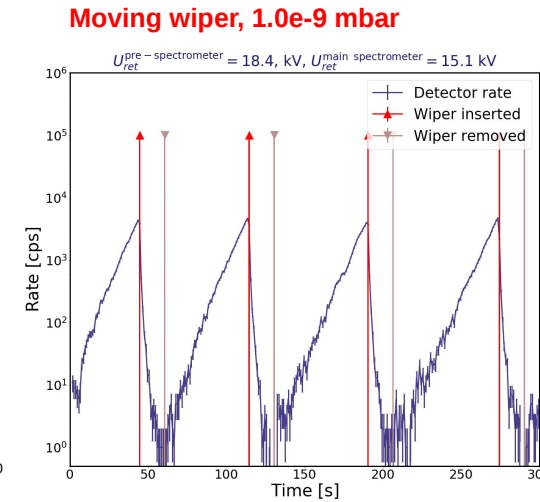
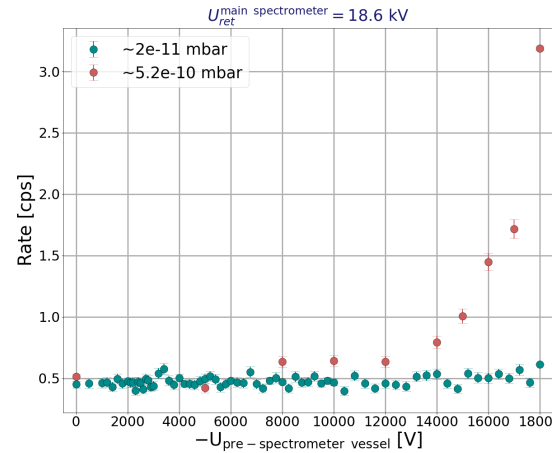


**The interspectrometer Penning trap region. (from PhD thesis of B. Hillen).**

- In this poster, we want to present a solution of this problem: Penning wipers – 3 metal rods installed in the valve at the superconducting magnet between the spectrometers, which can be mechanically moved inside the flux tube to collect and remove trapped particles, which find their way to the wipers due to magnetron motion.

# Measurements

- Background rate dependencies on spectrometer voltage and pressure were studied and effectiveness of the Penning wiper in stopping and preventing discharges was demonstrated.
- Final free-of-discharges long-term background measurement with nominal pressure ( $\sim 4e-11$  mbar), electric and magnetic settings of the spectrometers showed a possibility to operate both spectrometers in tandem during KATRIN data-taking, with Penning wipers being a reliable safety measure.



**For more information,  
please see the poster at:  
Monday Session, Poster Wall #4  
(Robert-Schumann-Room)**

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