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P1.054 **Tritium ion blocking and detection in the KATRIN experiment**

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The aim of the KATRIN experiment is to determine the absolute neutrino mass scale in a model independent way, by measuring the electron energy spectrum shape near the endpoint of the tritium beta decay. For this purpose, KATRIN uses a high resolution MAC-E filter and a high intensity Windowless Gaseous Tritium Source (WGTS). In the WGTS, beta decays and ionizations produce about $2\cdot10^{12}$ tritium ions per second. About 10% and 1% of that rate is the expected flux of positive tritium ions and T^- ions towards the detector.

The beta electrons from the WGTS are guided to the spectrometers by a high magnetic field. The neutral tritium gas will be prevented to reach the spectrometers by the differential and cryogenic pumping sections (DPS and CPS). Tritium ions, however, are guided by the magnetic field without being pumped by the DPS and CPS. Therefore, positive tritium ions could reach the spectrometers and cause an extremely large background from tritium contamination, which would spoil the KATRIN neutrino mass measurement. To remedy this problem, positive ions will be blocked in the transport system by a positive potential. Positive ions trapped between the blocking potential and the WGTS gas ow will be removed by specially designed dipole electrodes in the DPS.

Ion detection is necessary to confirm the successful ion blocking and to validate the WGTS plasma model. An FT-ICR trap in the DPS allows to investigate the ion composition. With a Faraday Cup in CPS, the current of ions and secondary electrons from WGTS can be measured. Very small remaining ion current can be detected via ionization of residual gas inside the spectrometers.