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Electromagnetic Design Improvements for the Rear Section of the KATRIN Experiment

The aim of the KATRIN experiment is to determine the neutrino mass by the model independent kinematic investigation of the tritium-beta-decay with a sensitivity of 200meV/c^2 (90% C.L.). The experiment consists of a windowless gaseous tritium source, multiple-stage pumping sections, a system of two electrostatic spectrometers and a multi-pixel semiconductor detector. At the upstream end the setup is completed by the so-called "rear section".
The rear section, on one hand, is designed as a vacuum-tight closure of the tritium-bearing volume of the experiment, which at the same time defines the electrostatic potential inside the beam tube of the source. On the other hand, it houses essential calibration and monitoring instruments. For calibration purposes an electron gun provides a beam of quasi monoenergetic electrons which are magnetically guided through all KATRIN components. In order to precisely investigate systematic effects at KATRIN, it is important to minimize the beamspot size as well as the angular and energy distribution width of the electron gun. Therefore detailed simulations on the electromagnetic design of the rear section have been performed.
This poster presents how existing simulations have been improved and the optimized configuration has been implemented in the comprehensive KATRIN simulation framework.

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