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Studies of Background Ions of the KATRIN Experiment[1] ANA PAULA VIZCAYA HERNANDEZ, Carnegie Mellon University, KATRIN COLLABORATION — The best direct limit of the effective electron neutrino mass comes from the KATRIN (KArlsruhe TRItium Neutrino) experiment, which aims to measure the mass with an unprecedented design sensitivity of 0.2 eV at the 90% confidence level. The neutrino is produced in tritium beta decay and its mass is derived by fitting the energy spectrum of the beta-electrons near the kinematic endpoint of 18.6 keV. Magnetic fields guide charged particles through the energy-analyzing retarding spectrometers towards the KATRIN detector. Ions from the source propagating to the spectrometers would act as a background source due to the production of secondary electrons that can be detected by the main detector. To prevent this, ions must be blocked by electrodes. We have measured the flux of source ions for different tritium column densities and always found it below the design limit. We calibrated the ion monitoring devices. We tested the blocking efficiency of the electrodes and measured the characteristic timescale of each electrode's neutralization, resulting from secondary electrons getting trapped in the positive potentials created by them. We will share the results of these tests and the preferred settings for future neutrino-mass operations.

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