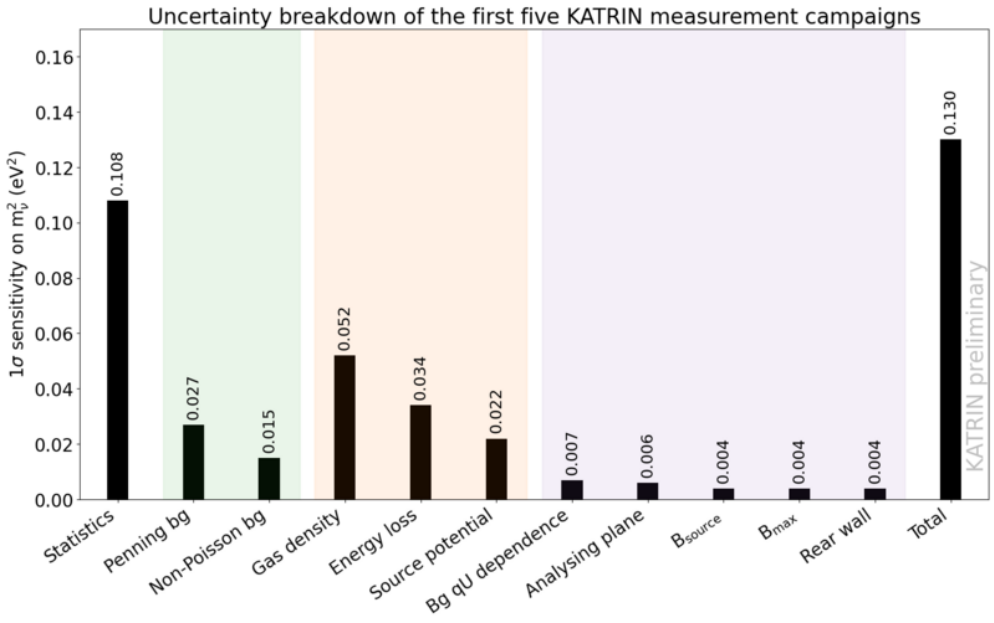
Main uncertainty sources

The KATRIN result from the first five measurement campaigns is dominated by statistical uncertainty. Main systematic contributions can be found as below:



- Gas density is measured by electron gun. It has been found recently that the angular distribution of electrons from the electron gun depends on their energy, which is not fully understood; a quick solution with conservative estimation has been adopted.

- Energy loss function is calibrated by an integral measurement and a time-of-flight measurement of electrons from the electron gun. A conservative estimation has been taken to account for the discrepancies in between these two methods.

- Source potential is calibrated with Krypton conversion lines, and is expected to be the dominant systematic contribution for the following campaigns.

- Penning background comes from the trapped electrons in between the pre- and the main spectrometer, and has been eliminated by turning off the pre-spectrometer starting from KNM5.

- Background overdispersion results in a non-Poisson distribution, which comes from trapped electrons in the main spectrometer. Such background component has no longer been observed under the asymmetric SAP configuration.