The goal of the TRIMS experiment is to measure the molecular tritium (T₂) β decay branching ratio to the bound state \(^3\text{HeT}^*\). The setup consists of a decay volume filled with T₂ gas, with one silicon detector on each end. Mass-3 (dissociated) and mass-6 (molecular) ions can be distinguished using ion energy and time of flight relative to the beta electron.

To understand the TRIMS energy reconstruction and compute correct branching ratios as a function of beta energy, we modeled scattered interactions inside the dead layer with SRIM [2] and KESS [3].

- Total detector thickness of 500 µm.
- Dead layer of 100 nm in which the energy deposited is not completely recovered in the voltage signal.

Applying the package KESS [3] of the Kassiopeia software, simulations of electrons in silicon were carried out.

- Initial energy from 5 keV to 80 keV
- 2 keV steps
- 10³ electrons in each energy range.

- High-energy ions are less likely to be backscattered and more likely to pass through the dead layer. \(^3\text{He}\) ions lose more energy in the dead layer than T ions due to their nuclear charge.
- The relative energy loss of electrons in the dead layer decreases rapidly with the increasing initial energy.
- By including these results in the TRIMS simulation, we can obtain a more accurate understanding of the data.

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