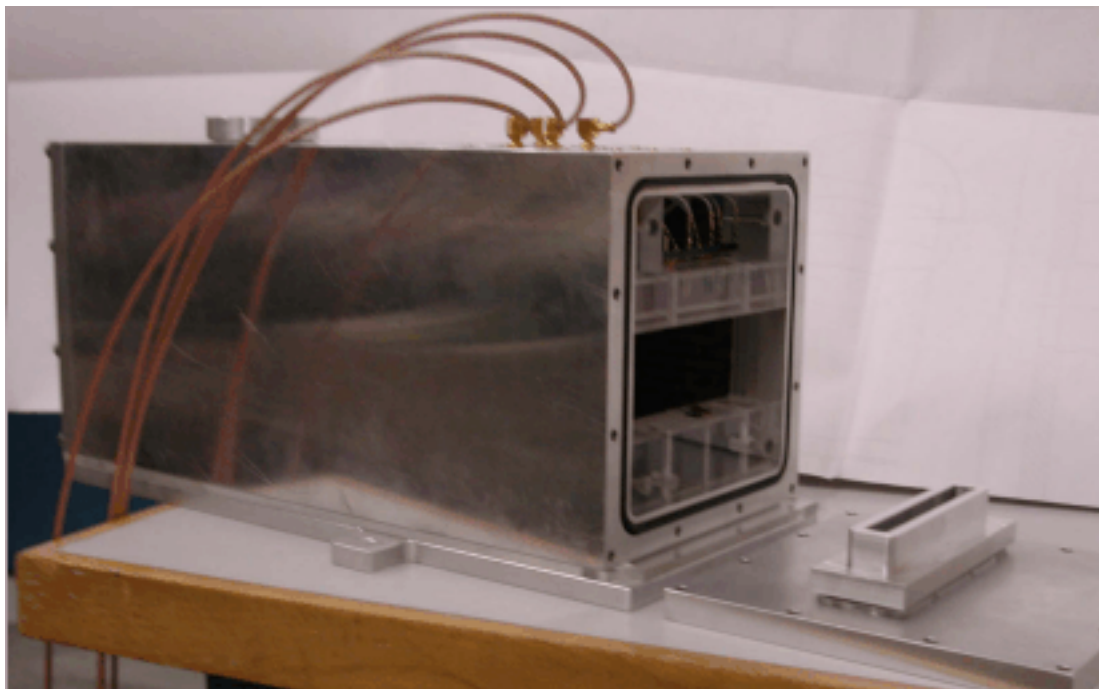
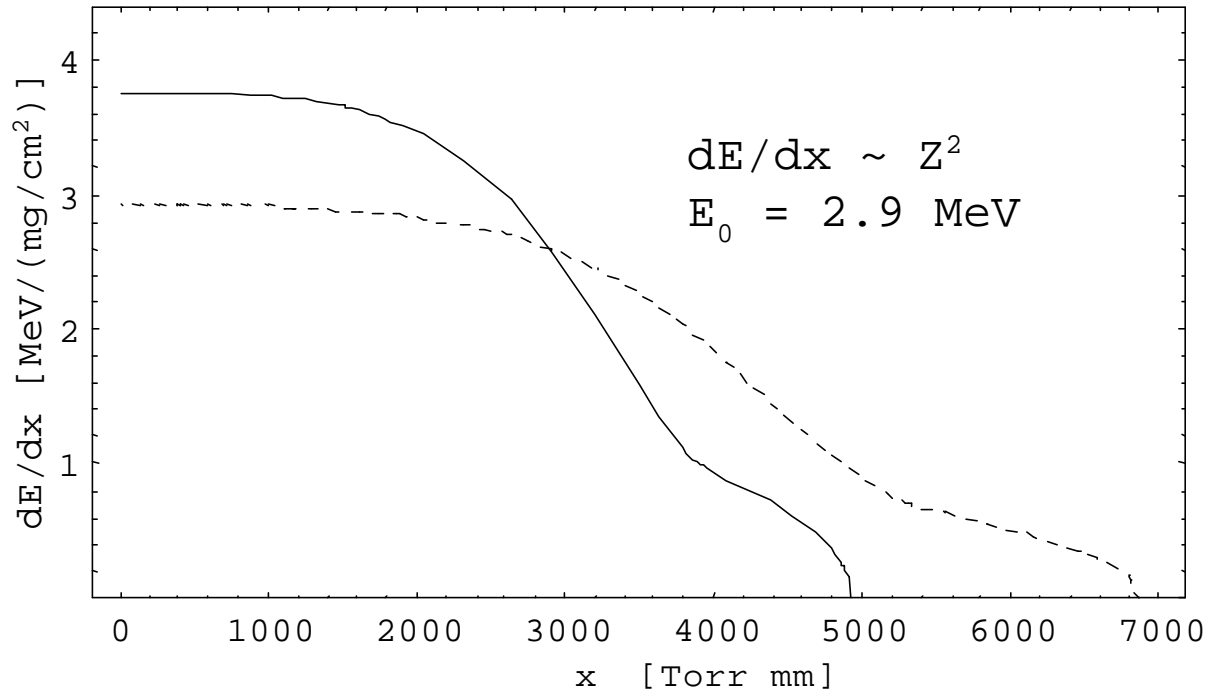


Application of Gas Ionisation Detectors in Accelerator Mass Spectrometry (AMS)

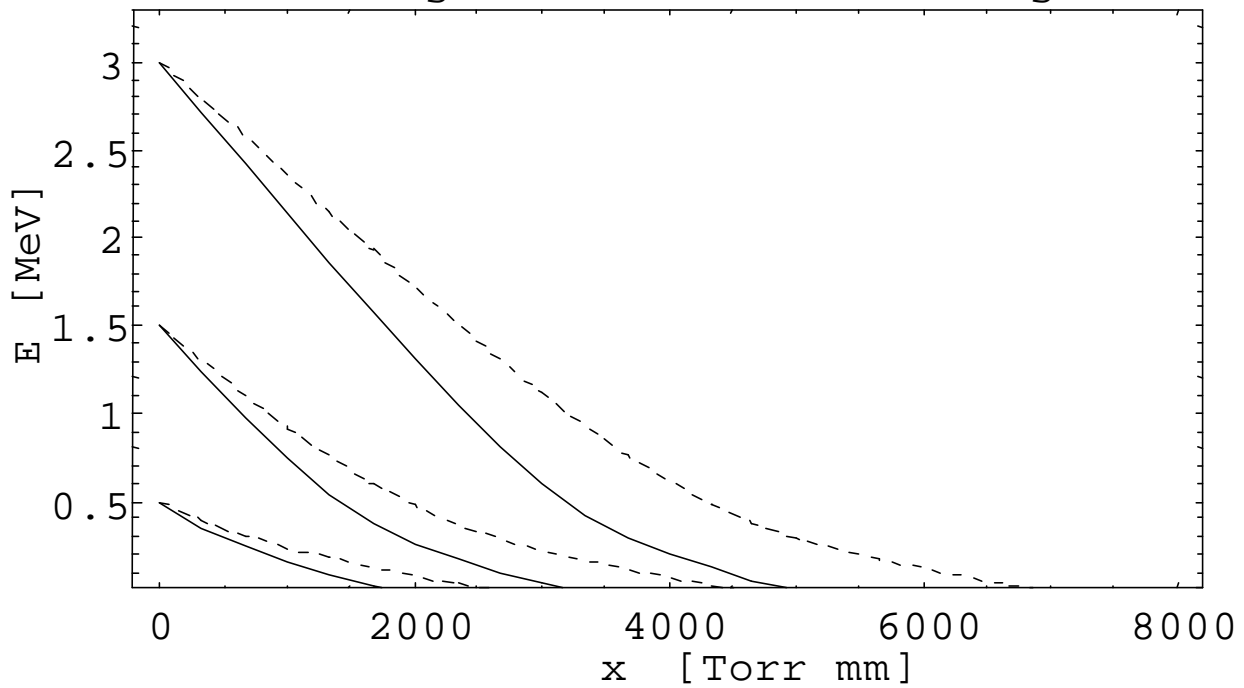
C. Maden

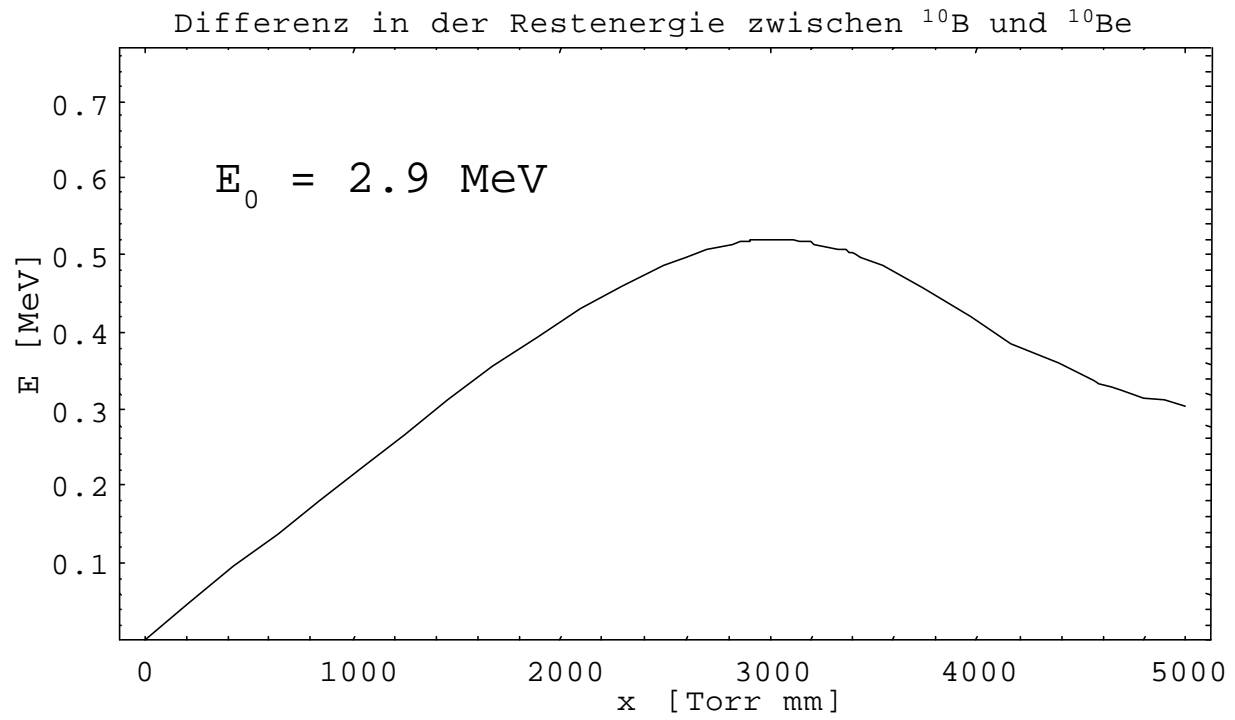


Stoppingpower von ^{10}B und ^{10}Be in Argon



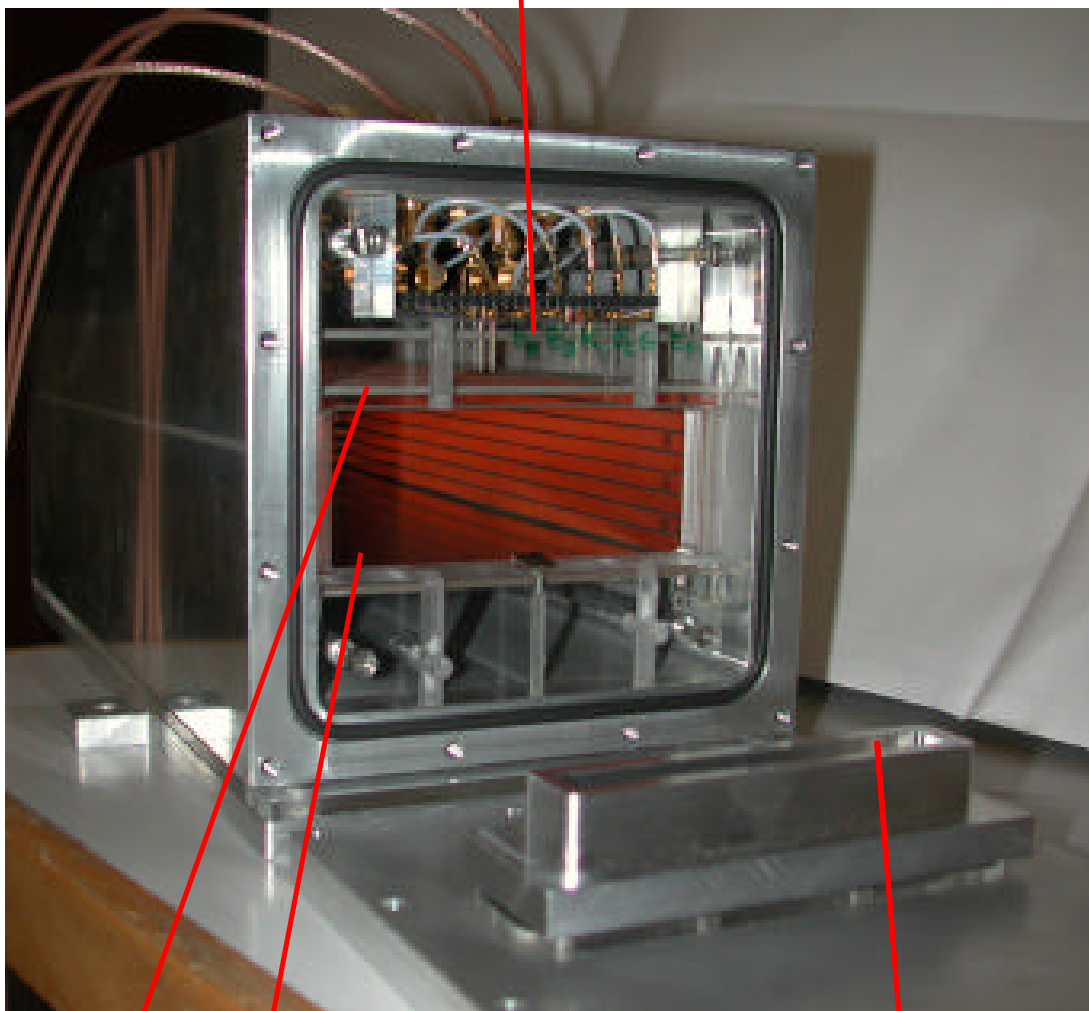
Restenergie von ^{10}B und ^{10}Be in Argon





The Inside of a Gas Ionisation Detector

anodes



entrance foil

cathode

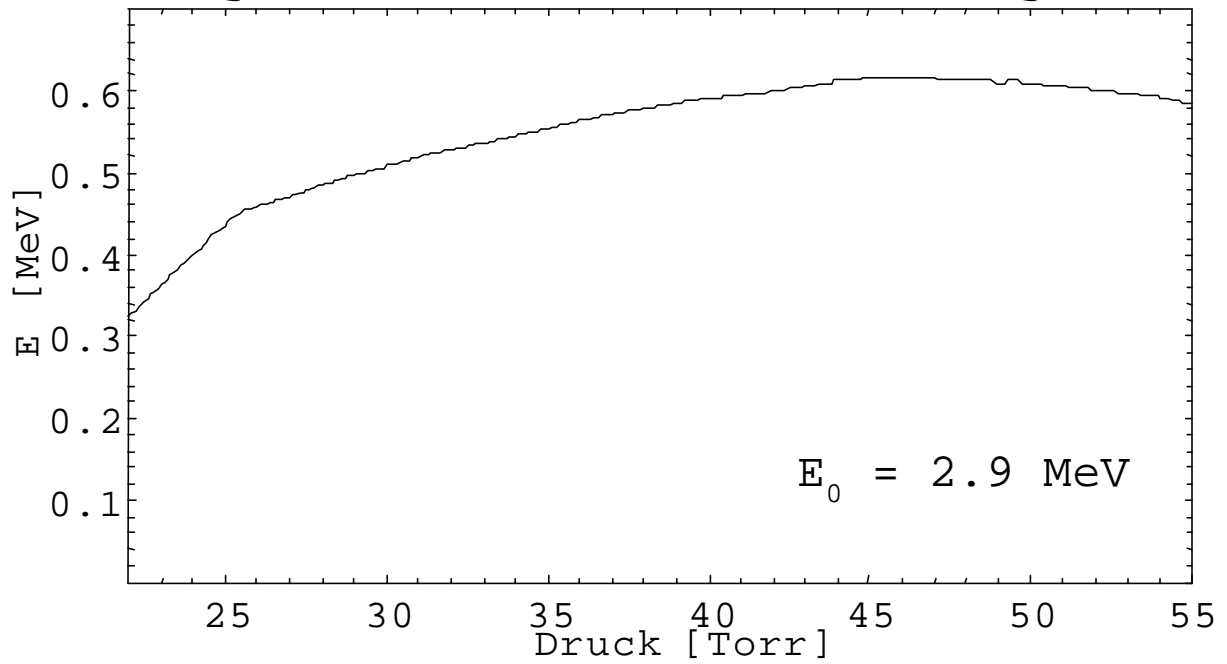
Frisch grid

The Future of Gas Ionisation Detectors in AMS

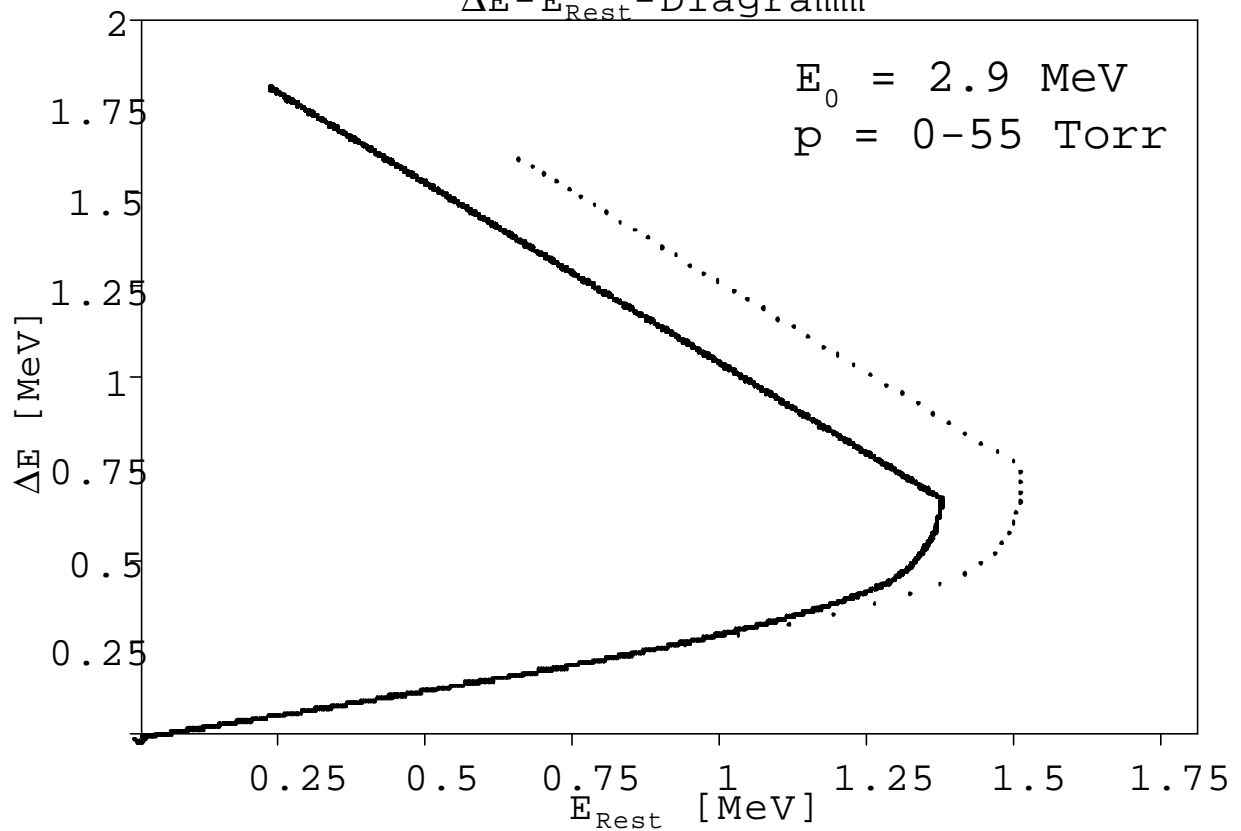
What are the limits to the suppression of isobaric interferences at low beam energies? (1 - 2 MeV)
Example: suppression of ^{10}B with respect to ^{10}Be

Explore the potential of position sensitive gas ionisation detectors for the measurement of isotopic ratios of heavy elements such as Ag, Ir or Pt with a view to building a position sensitive detector for ERDA (Elastic Recoil Detection Analysis)

Restenergiedifferenz für feste Detektorgeometrie



$\Delta E - E_{\text{Rest}}$ -Diagramm



Measured suppression factors of ^{10}B against ^{10}Be

energy [MeV]	suppression factor	stat. error	pressure in detector [Torr]
2.9	$<6.4 \cdot 10^{-7}$	95% CL	37.2
2.3	$1.0 \cdot 10^{-6}$	100%	25.6
1.7	$1.0 \cdot 10^{-6}$	100%	18.2

Expected suppression factor: $10^{-3} - 10^{-4}$

Preliminary summary on the suppression of isobaric interferences at low beam energies

The suppression of ^{10}B with respect to ^{10}Be in a gas ionisation detector is already nearly 3 orders of magnitude better than expected at beam energies of 1 - 2 MeV. (10^{-6})

The resolution of the detector can be improved by using a thinner entrance window to the detector.
For example SiN-wafers of about 100 nm thickness.

A reduction of noise on the amplifier signals will contribute significantly to the improvement of the resolution of the detector.

Conclusion

Eventhough AMS is developing towards lower beam energies, gas ionisation detectors still have to be considered when designing a detection system for the suppression of isobaric interferences.

The field of AMS is an ideal test site to explore the potential of position sensitive gas ionisation detectors for developments in materials science, especially for Elastic Recoil Detection Analysis (ERDA).