GEM Detector Characterisation
Group 1

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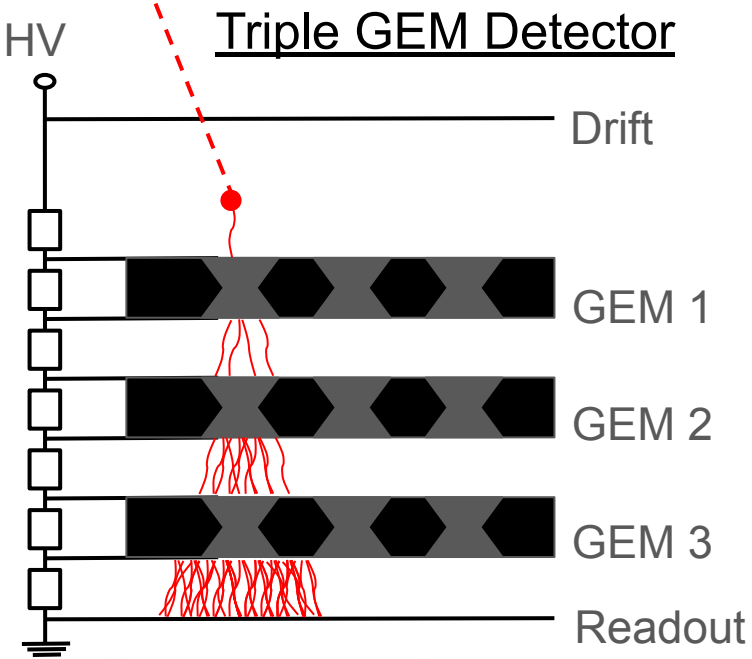
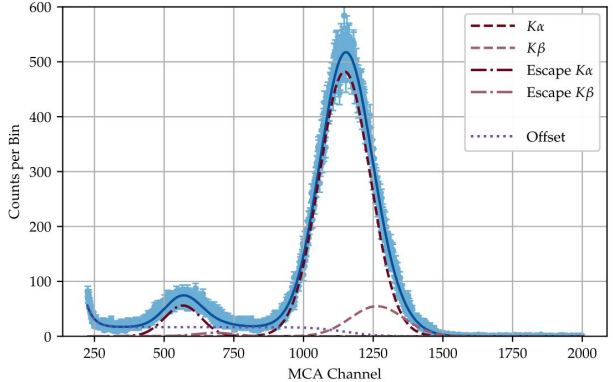
PHYSICS AT THE TERA SCALE
Helmholtz Alliance

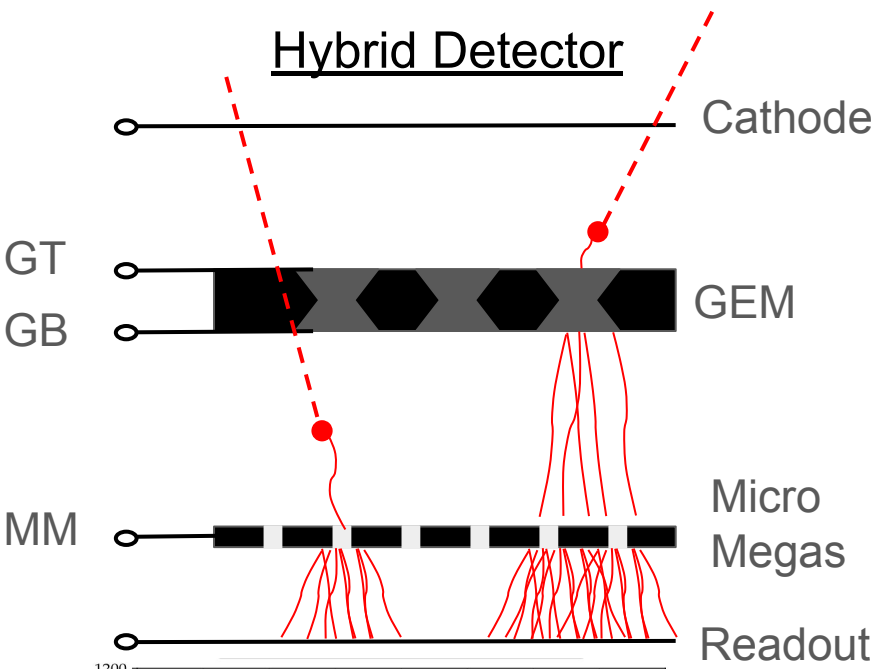
UNIVERSITÄT BONN FTD

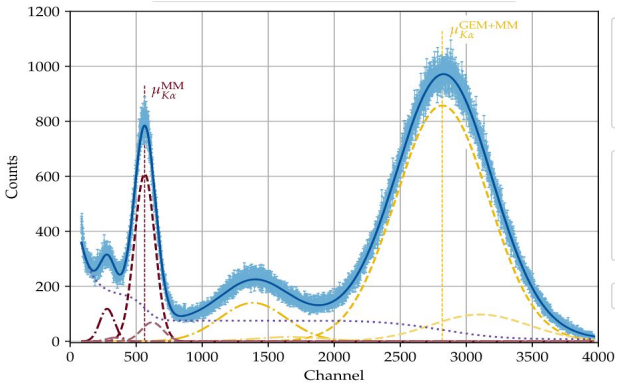
Triple GEM Detector



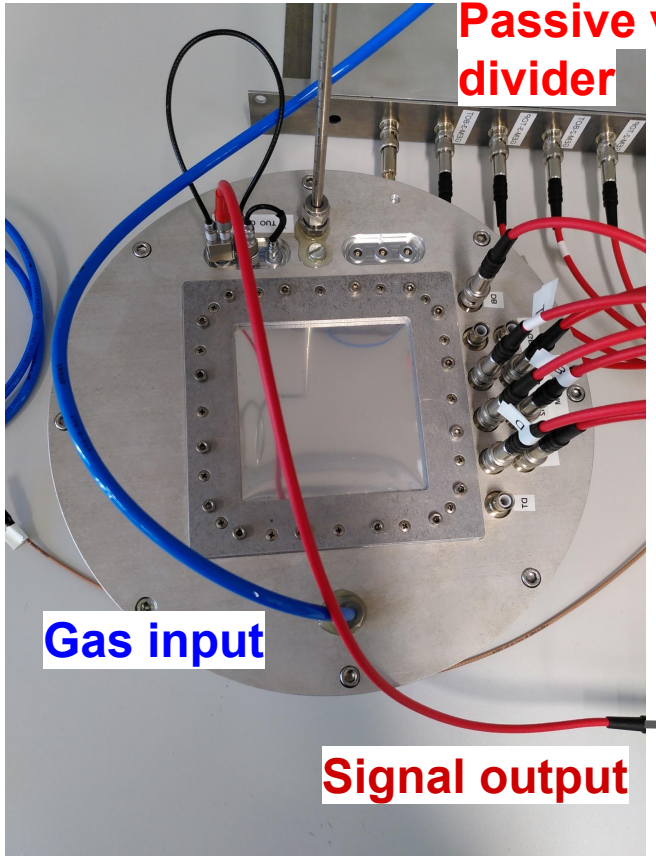


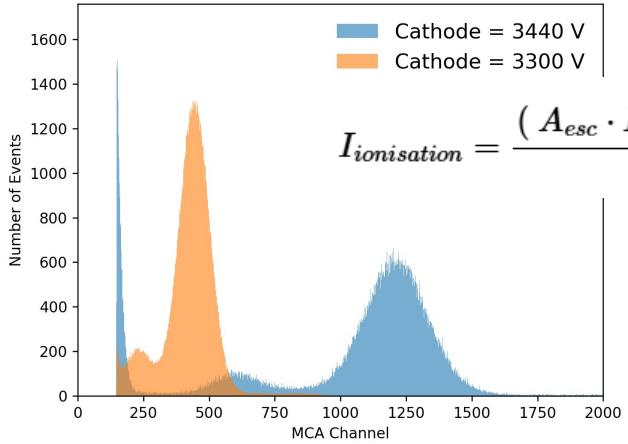
Hybrid Detector





Measurements using a triple GEM detector





$$I_{ionisation} = \frac{(A_{esc} \cdot E_{avg,esc} + A_{\alpha\beta} \cdot E_{avg,\alpha\beta}) \cdot q_e}{t_{meas} \cdot W_{ion}}$$

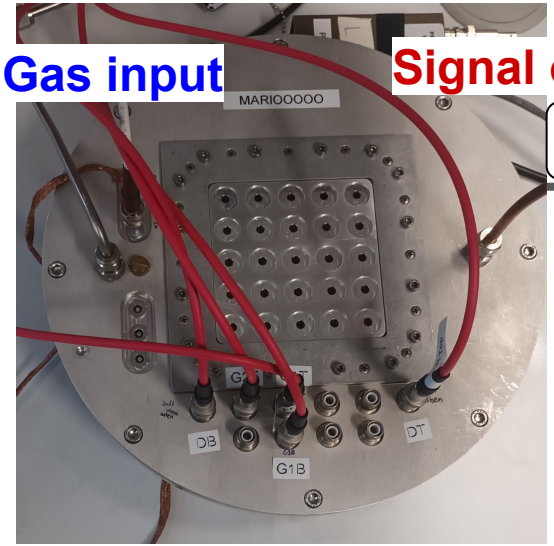
I_{3440V} = 39 fA
I_{3300V} = 39 fA

A

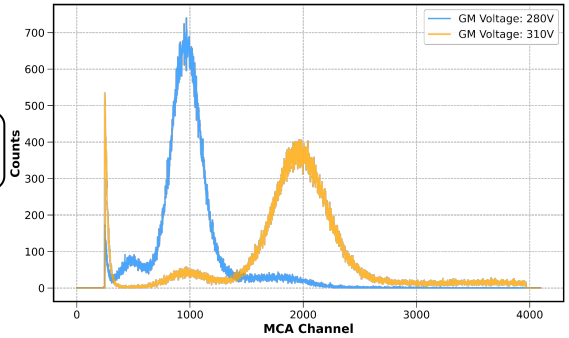
$I_{readout}$:
I_{3440V} = 250 pA
I_{3300V} = 95 pA

➜ Gain G = $I_{readout}$ / $I_{ionisation}$
$G_{3440V} \approx 6410$
$G_{3300V} \approx 2436$

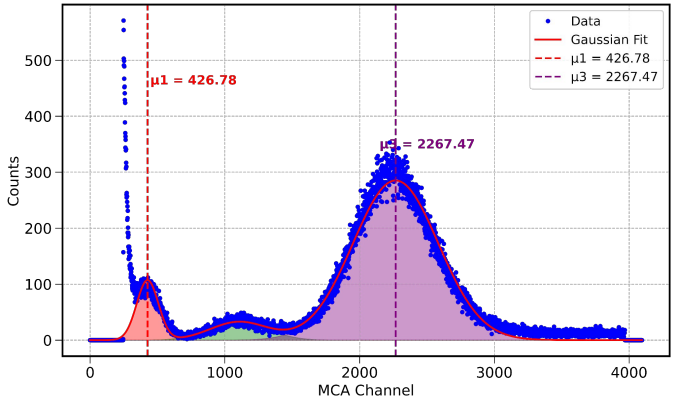
Measurements using a hybrid detector

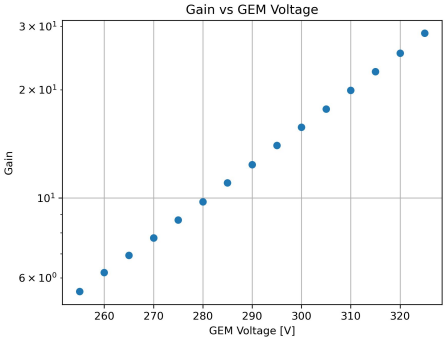


MCA Spectrum



Analysis

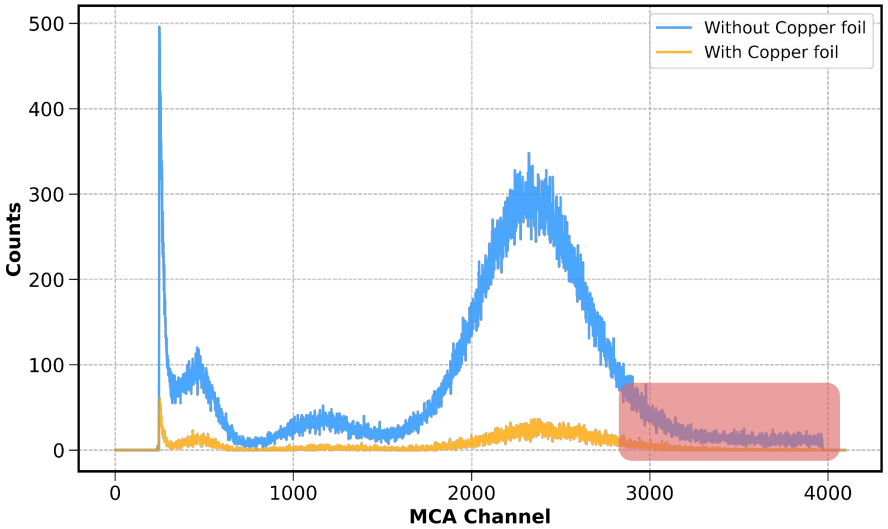




$$G_{eff} = \frac{\mu_{K\alpha}^{GEM+MM}}{\mu_{K\alpha}^{MM}}$$

Measurements using a hybrid detector

Reduce the pile-up effect by introducing a copper foil



Testing different TF1 values