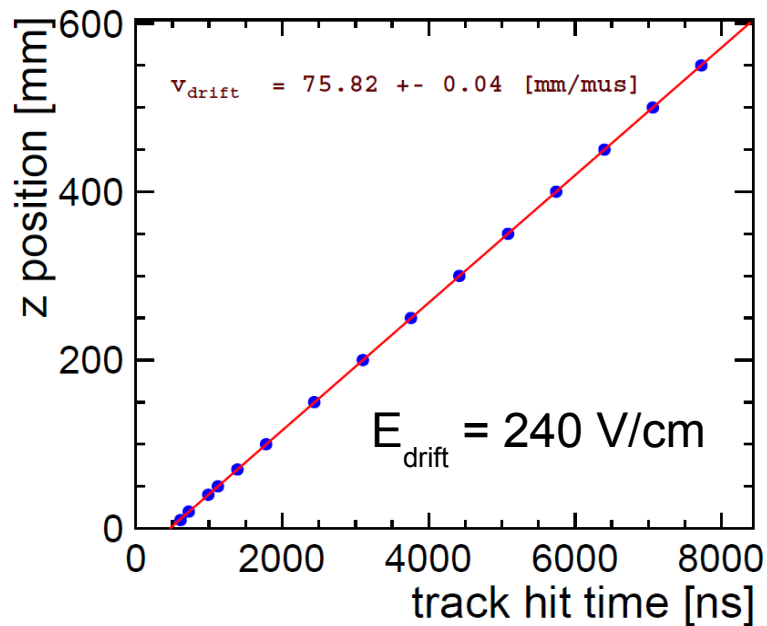# 3 DESY GridGem-Modules Test Beam

Felix Müller, Ralf Diener, Astrid Münnich, Leif Jönsson, Ulf Mjörnmark, Klaus Zenker, Isa Heinze, Oleksandr Volynets, Volker Prahl, Ties Behnke, Robert Volkenborn
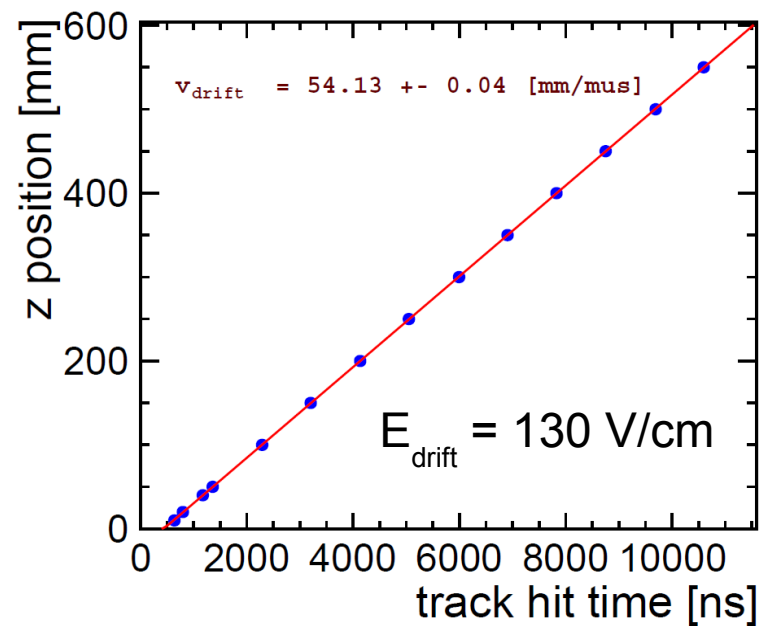
HELMHOLTZ
| GEMEINSCHAFT

LC TPC

DESY

Drift Velocity

> Simulated

- 240 V/cm: v_{drift} = 75.94 +- 0.03%

- 130 V/cm: v_{drift} = 53.08 +- 0.07%

> Reconstructed

- 240 V/cm: v_{drift} = 75.82 +- 0.04 (B= 1T)

- 240 V/cm: v_{drift} = 76.11 +- 0.05 (B= 0T)

- 130 V/cm: v_{drift} = 54.15 +- 0.07%

v_{drift} = 75.82 +- 0.04 [mm/mus]

E_{drift} = 240 V/cm

v_{drift} = 54.13 +- 0.04 [mm/mus]
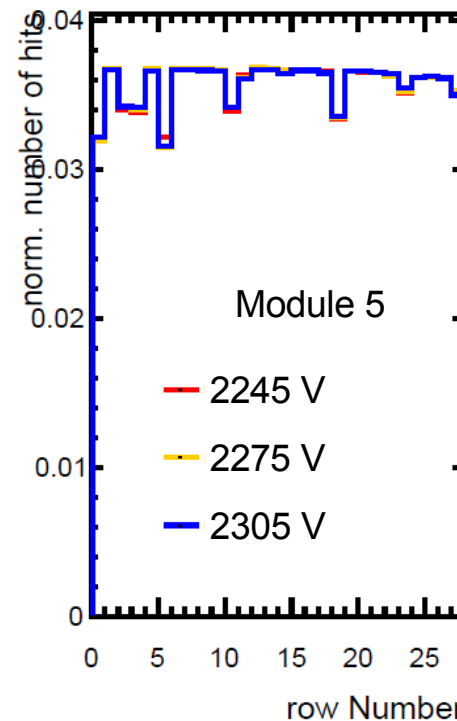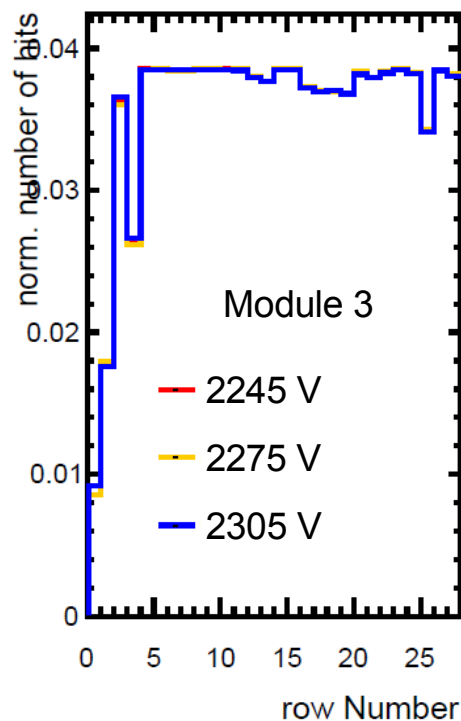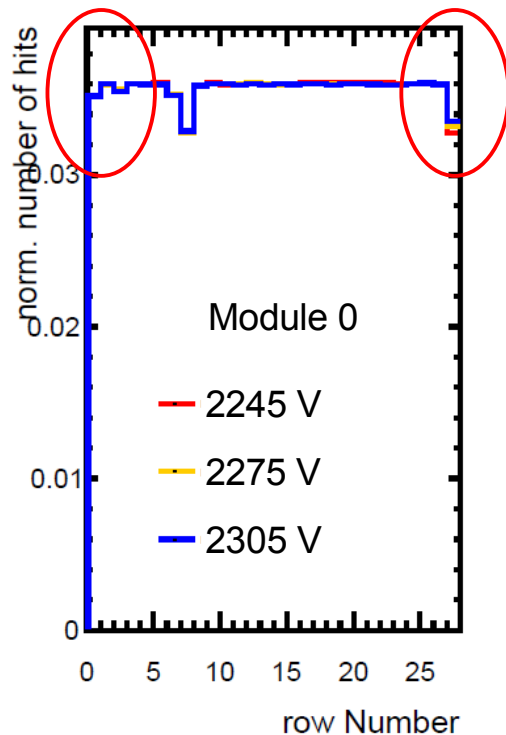
E_{drift} = 130 V/cm

Guard Ring

> Magnetic field on

> Vary guard ring potential and observe hit efficiency and xy-residuals

> Small effect on the xy-residuals

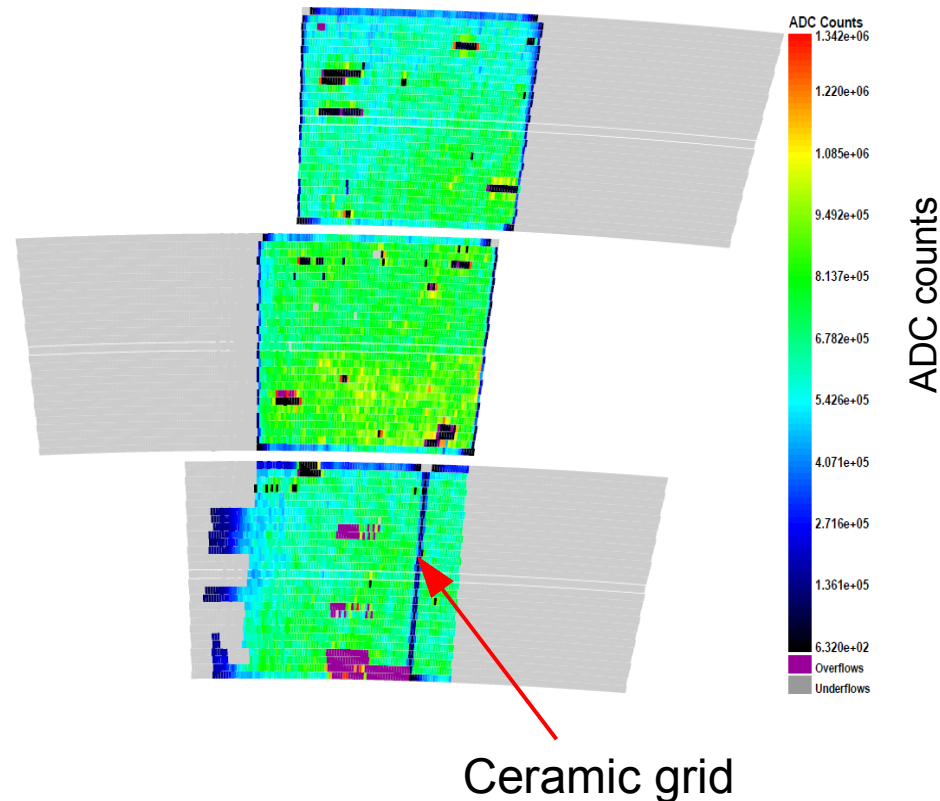- Slightly better with higher potential

Guard Ring

> Hit efficiency shows no influence for different potentials

- Large fluctuations due to dead channels

> Overall very good hit efficiency

- >90% for rows at the border
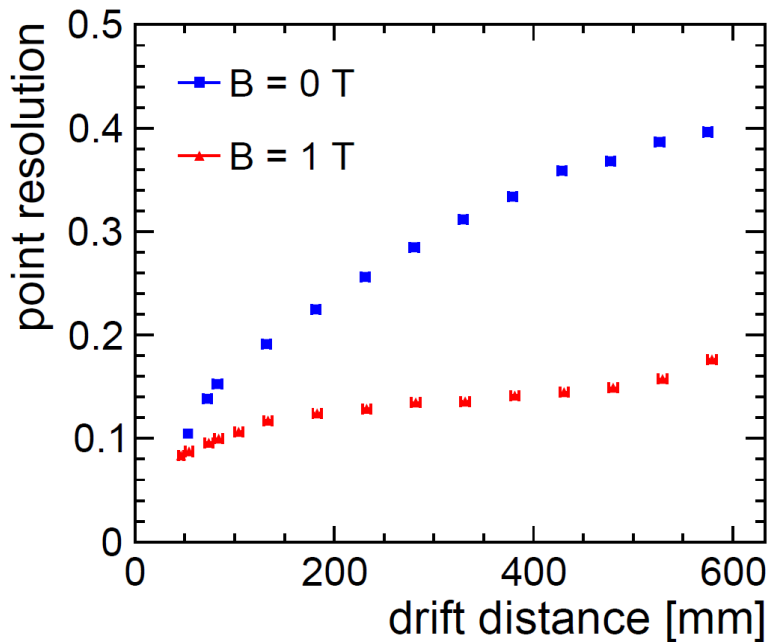
- Module without guard ring <60%

Efficiency

> X-scan while taking data

> Hit efficiency very high but charge efficiency reduced at the outer rows

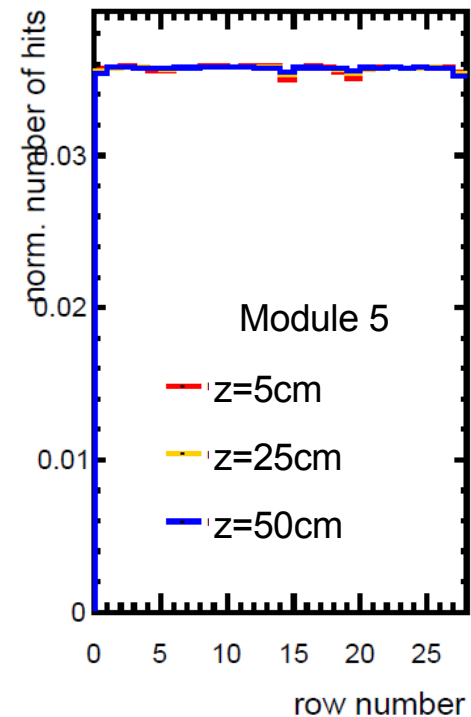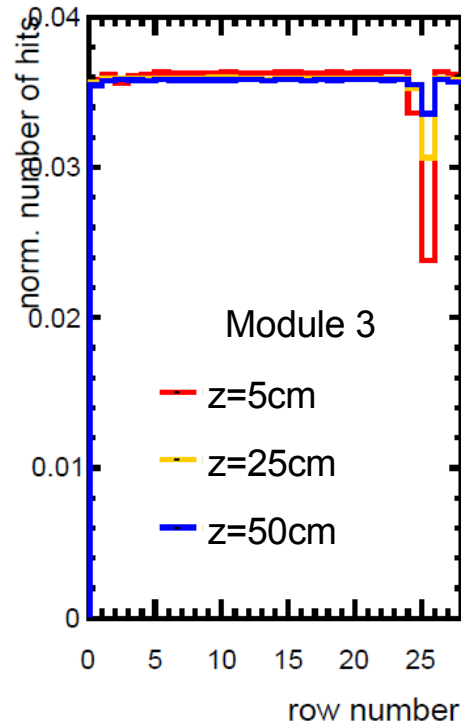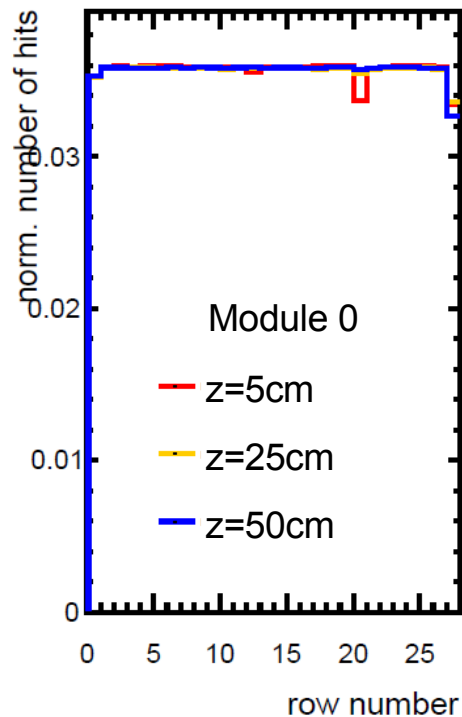> Reduced gain or reduced number of primary electrons?

Ceramic grid

Transverse Point Resolution

> Track finding and fitting with CLUPATRA

> Point Resolution for B=0 T shows the expected behavior

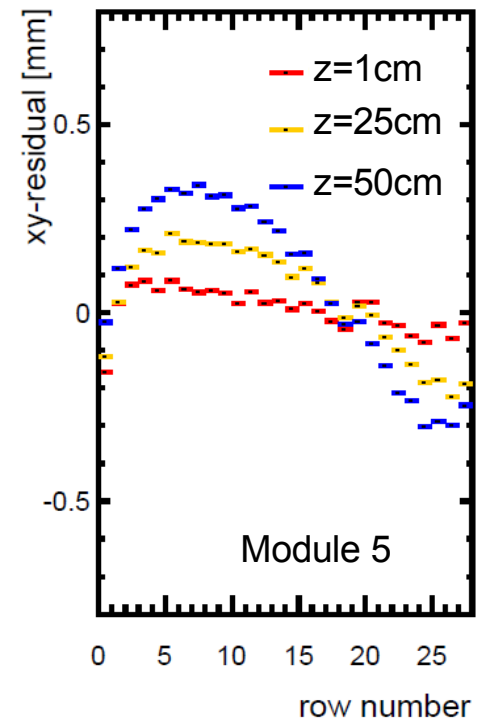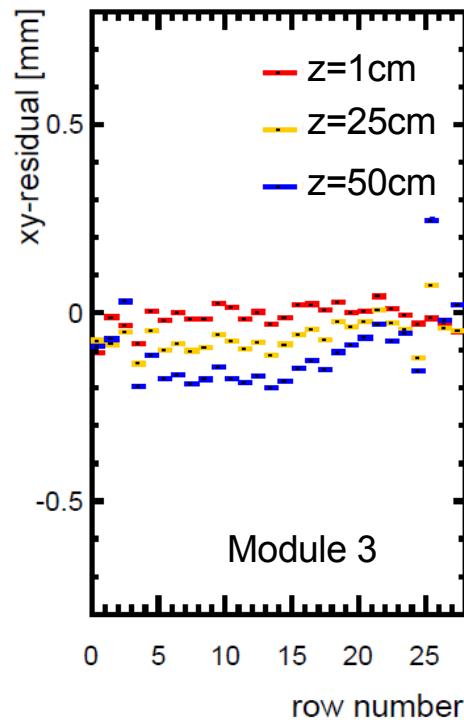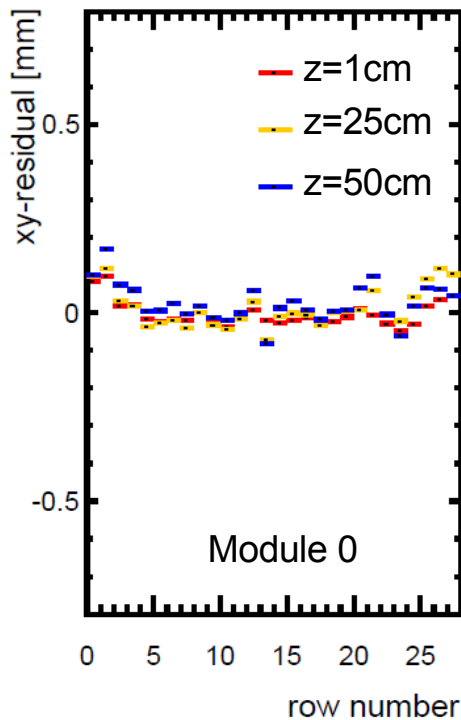> Point Resolution for B=1 T displays a rise at large drift distances

Influence of the Drift Distance

> Efficiency is not influenced by the drift distance (as expected)

> Still very high efficiency without magnetic field
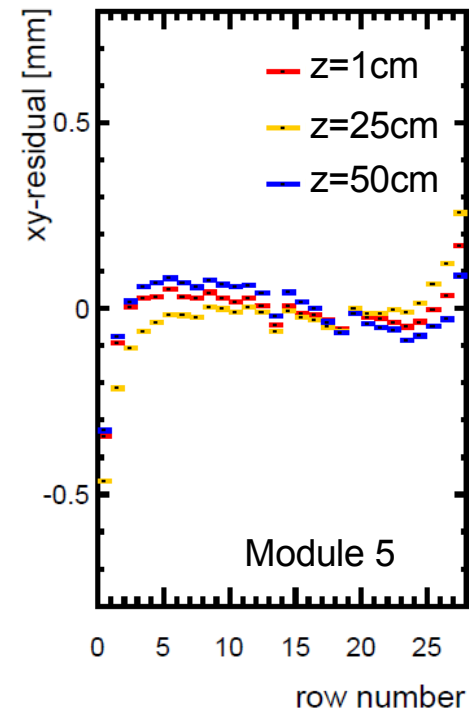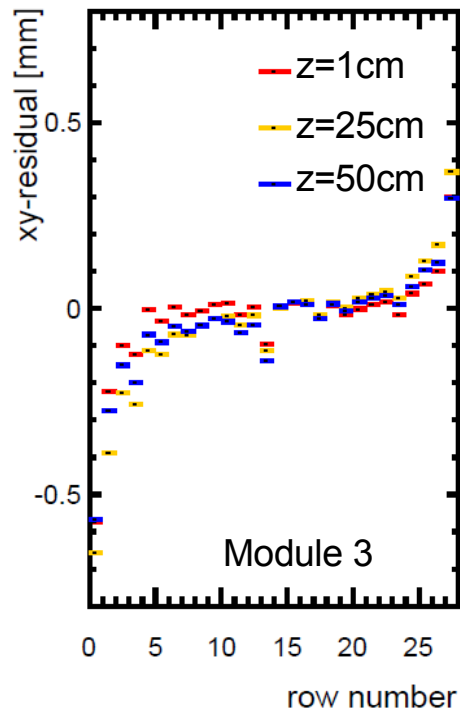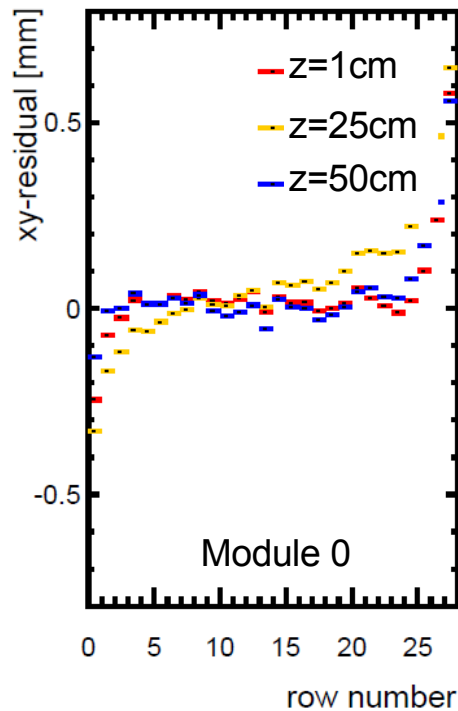
Influence of the Drift Distance

> 0 T magnetic field

> Second and third module show large deviations from 0

> Gets worse with larger drift distance

Influence of the Drift Distance

> 1 T magnetic field

> Less pronounced distortions at the third module

> Dependency on the drift distance still visible

Conclusion

> The additional guard ring

- increases the hit efficiency significantly

- has only a minor influence on the xy-residuals

> Field distortions seem to be dependent on the drift distance

- Also visible without magnetic field (not only E x B effects)