

# Plastic scintillator fiber detectors for heavy ion trajectory reconstruction for the Super-FRS at FAIR

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At the FAIR facility, currently under construction at GSI (Darmstadt), a 1.5 AGeV uranium beam with intensities up to intensity  $2.5 \times 10^{11}$  <sup>238</sup>U/spill will impinge on a graphite target at the entrance of the Superconducting Fragment Separator (Super-FRS) for the production of a wide range of rare isotopes by projectile fission and fragmentation. The next generation in-flight magnetic separator Super-FRS [1] operated up to a magnetic rigidity of 20 Tm with a large angular acceptance ( $\Delta\theta = \pm 40$  mrad,  $\Delta\phi = \pm 20$  mrad) and momentum acceptance ( $\Delta p/p = \pm 2.5\%$ ) requires a new generation of tracking detectors with a position resolution of 0.2 mm ( $\sigma_x$ ) over large detector areas of about 30 cm<sup>2</sup>.

Besides gas detectors, planar detectors made of scintillating fibers are an option worth investigating not only because of the comparable material budget but especially for the fast response and high-rate capability. In addition, large area detectors made of 200  $\mu\text{m}$  squared fibers are being developed at GSI and used already in some R<sup>3</sup>B experiments [2].

On the poster a one-dimensional prototype consisting of 128 fibers with active area of 25.6x100 mm<sup>2</sup> coupled to Multi-Pixel-Photon Counters (MPPCs) and readout by FPGA TDC will be presented together with some recent <sup>197</sup>Au beam test results.

## References:

- [1] M. Winkler et al., The status of the Super-FRS in-flight facility at FAIR, Nucl. Instr. Meth. B 266 (2008) 4183
- [2] S. Paschalis et al., Heavy-ion tracking detectors for the R3B setup, GR-2014-1-NUSTAR-KR-10, GSI Report 2014-1