HELMHOLTZ

HZB Helmholtz Zentrum Berlin

Diagnostics, monitoring and analysis of high-energy proton beams

Georgios Kourkafas on behalf of Alina Dittwald
ARD ST3 Meeting 2025
DESY, Zeuthen

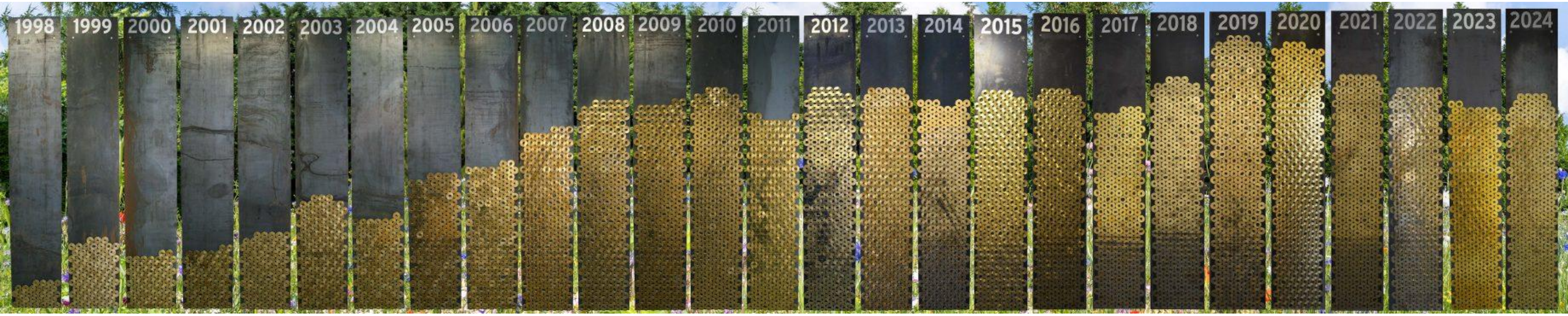
MT ARD

HZB Helmholtz Zentrum Berlin

Proton Cyclotron @ HZB, Berlin Wannsee

Main application: therapy of ocular tumours with CHARITÉ university hospital Berlin. Other applications:

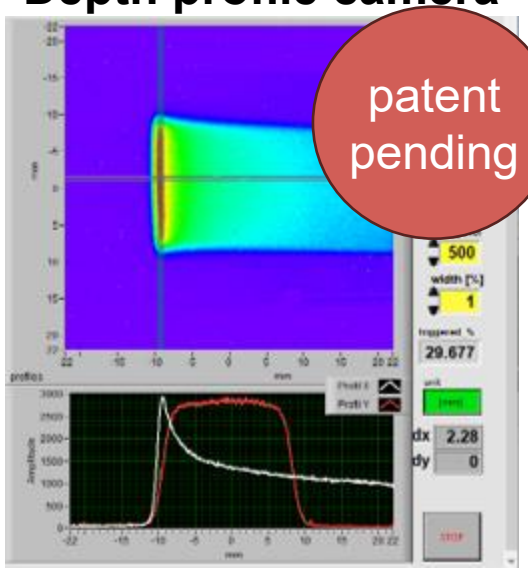
- accelerator research and development (ARD)
- radiation hardness tests on electronics and solar cells for space
- life sciences
- versatile user-driven irradiation campaigns



world-wide leading treatment facility
high impact papers based on experiments at HZB's proton beams

Systems for beam spot analysis & depth profile visualization

Depth profile camera

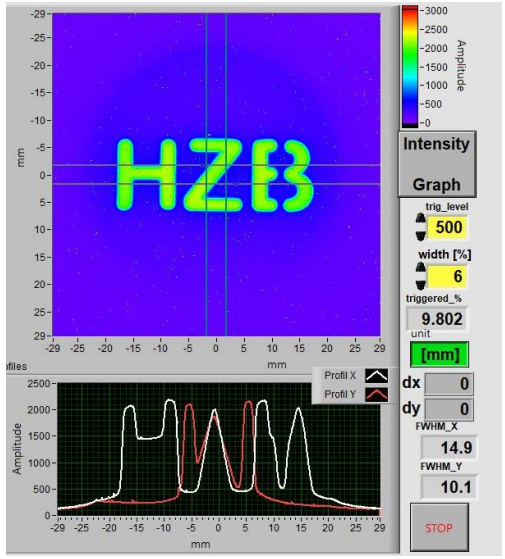


Optical system for depicting the **ion range** and Bragg peak with a 100 µm water-equivalent resolution, along with the integrated transverse beam profile

Q-eye

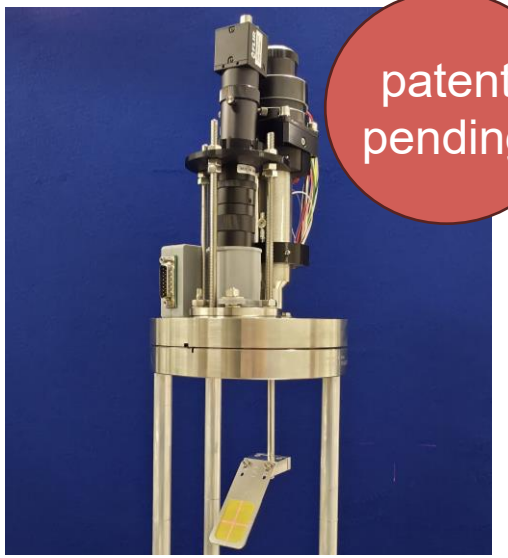
Multileaf Faraday Cup technology from HZB with a water-equivalent resolution of 120 µm transferred to industry and granted medical product verification

Field profile camera



Lightweight 3D printed camera system for the **transverse profile** in air able to measure beam currents down to 0.1 pA with a resolution of 50 µm as large as 60 mm

Optical BPM



Optical **beam profile monitor** using a thin ZnS layer on Kapton film, as a cost-effective solution with a potential of easy self-production with a resolution of 4 µm