HZB Helmholtz Zentrum Berlin

HZB TECHNOLOGY TRANSFER PRIZE 2021

Clinical range detector for proton therapy of eye tumors

From experimental beam instrumentation to certified medical product for quality assurance

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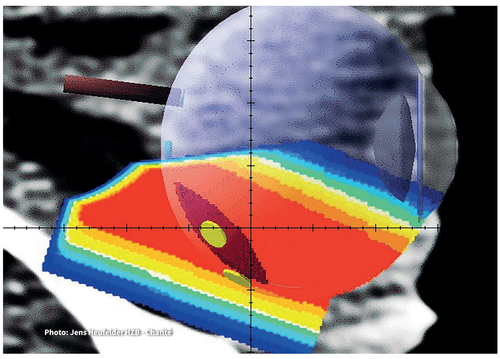
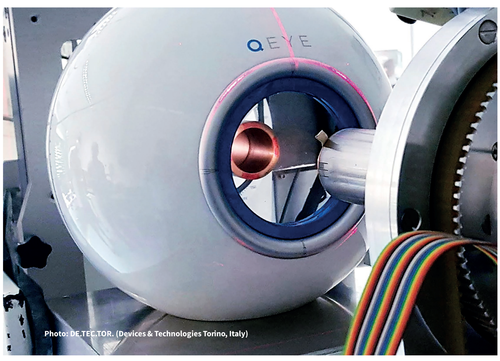


Eye (transparent sphere) radiotherapy requires µm precision to target tumors (in deep red) but avoid critical structures (brown & blue cylinders)



The final product commercialized by the company DE.TEC.TOR. as a certified medical device under the name Q-Eye, being tested at HZB.

INNOVATION

Proton radiotherapy is a very important tool in cancer treatment worldwide, with HZB providing the first such facility in Germany to more than 4000 patients until now. In 96 % of these cases, the eye tumors have been successfully treated, without impairing the vision.

The irradiation of the small volume of an eye (< 7 cm^3) requires µm precision in order to spare sensitive structures responsible for the eyesight (e.g. optical nerve). Existing range detectors on the market are designed for deeper tumors and fail to meet this strict demand.

To overcome this gap, a Multi-Leaf-Faraday Cup was developed at HZB, offering a quick and precise measurement of the proton range and the beam's depth-dose curve. With an accuracy of 100 µm and a relative resolution of 50 µm in water, it exceeds the requirements for eye tumor therapy.

The company DE.TEC.TOR. (Devices & Technologies Torino, Italy) collaborated with HZB to commercialize this detector as a certified medical device, after refurbishing the original design and extending its capabilities. The final product was evaluated as an instrument for clinical quality assurance at the HZB proton therapy beamline and has already been sold to other proton therapy centers.

A license agreement (fixed know-how fee + royalties) has been concluded with the DE.TEC.TOR. company for the industrialization of the HZB knowledge.

1. HZB detector achieved the resolution requirements for eye tumor therapy (100µm)
2. Successful technology transfer to industry, leading to a certified medical device
3. Product advertised online: https://detector-group.com/qeye-storycase