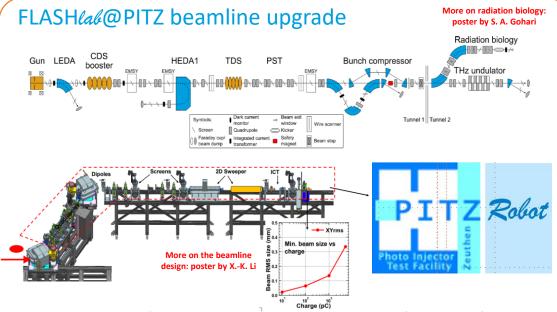
ON THE DEVELOPMENT OF THE "PITZ-ROBOT" FOR USE AT THE FLASH@PITZ EXPERIMENTAL AREA

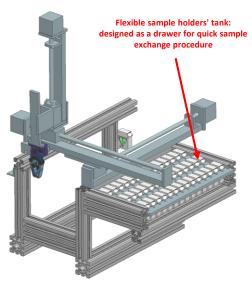
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- The **PITZ** accelerator (22 MeV, electrons) at DESY-Zeuthen is perfectly suited for FLASH-RT research, studies on a new **cancer treatment technique**, due to its **wide parameter range** available.
- Number of RF pulses, number of micropulses, micropulse charge, RF repetition rate and beam size can be adjusted
- Dose rates down from 0.02 Gy/s up to 10¹⁴ Gy/s are possible.
- Search for best parameters is ongoing
- Full FLASHlab@PITZ beamline was designed and is currently under installation.
- The PITZ-Robot, a tailored copy of the C-Robot for PITZ needs, is part of the upgrade package.

PITZ-Robot overview



- The PITZ-Robot is a version of the CLEAR-Robot (C-Robot¹), tailored for PITZ beam parameters and experimental needs.
 Its ongoing development takes place after commissioning of the C-Robot in the startup beamline at PITZ², applying the lessons leaned with the experience.
- Its main goal is the optimization of beam position alignment and dose delivery.
- · Consists mainly of:
 - 3 linear motors
 - 1 grabber
 - Storage area; and
 - Irradiation area

It is ARDUINO coded, and MATLAB controlled. MATLAB GUI has been adapted. A custom-designed 3D-printed holder with a YAG screen and a 45° mirror serves as a beam tracker. Real-time feedback is provided by a camera attached to the grabber. Possibility of using this device as online dosimetry tool is under investigation.

¹ P. Korysko et al. "The CLEAR user facility: a review of the experimental methods and future plans" in Proc. IPAC'23, Venice, Italy, May 2023.

² D. Villani et al. Commissioning of the C-Robot at the FLASHLAB@PITZ experimental area. Physica Medica, 2024 <u>10.1016/j.ejmp.2024.104183</u>

Outlook

- The PITZ-Robot is part of the upgrade package of the FLASH@PITZ, becoming the **main tool for sample manipulation** during irradiations.
- Hardware mounting is ongoing → commissioning together with upgraded beamline;
- Future applications of the PITZ-Robot also include studies on luminescence and dosimetry R&D.













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