CLIC CB, Updates, University of Oslo

Prof. Erik Adli, Dec 7, 2022

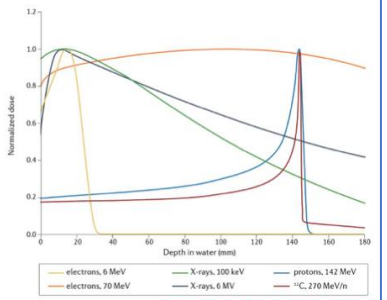
LC technology towards medical applications

[Rieker et al., IPAC 22, VHEE...in CLEAR]

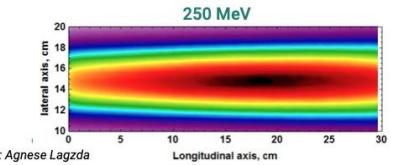
[Korysko, Sjobak et al., IPAC 22, Updates....at CLEAR]

What about VHEE?

- Penetration depth
  - Higher energies needed for deep seated tumours
- Precision of dose delivery
  - Flatter depth-dose curve than x-rays and protons:
    - ↳ Less sensitive to tissue inhomogeneities
    - ↳ Easier to treat large tumours
- Relatively compact and cost effective
  - Compared to protons
  - Higher availability possible



Vozenin, MC., et al. Towards clinical translation of FLASH radiotherapy. Nat Rev Clin Oncol (2022).



Courtesy: Agnese Lagzda

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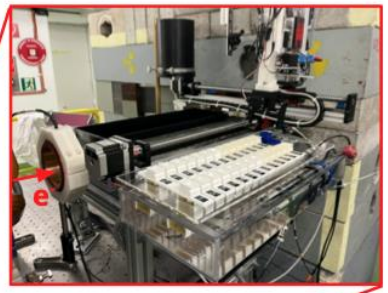
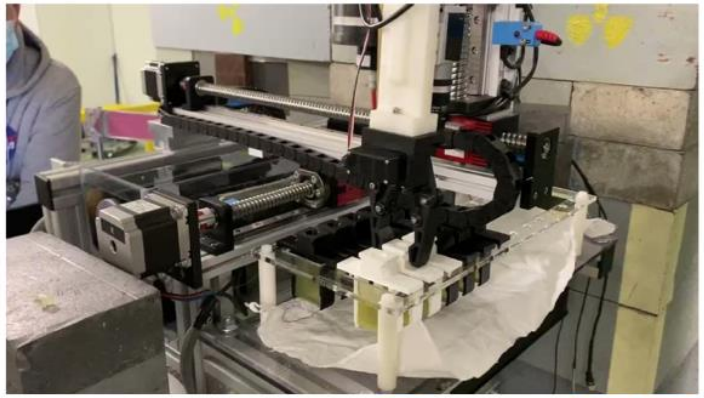
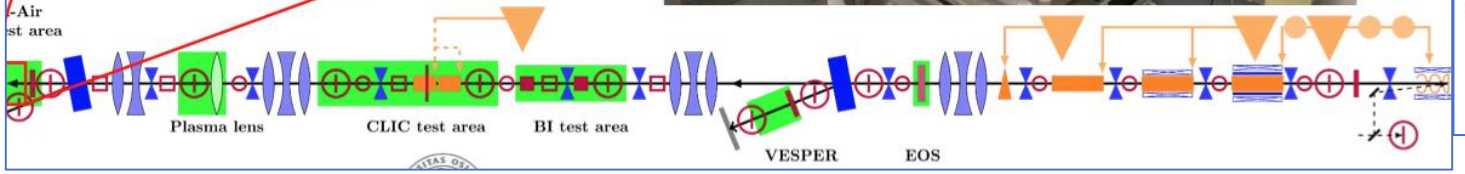
Experimental setup







Advanced accelerator technology potentially applicable to LC

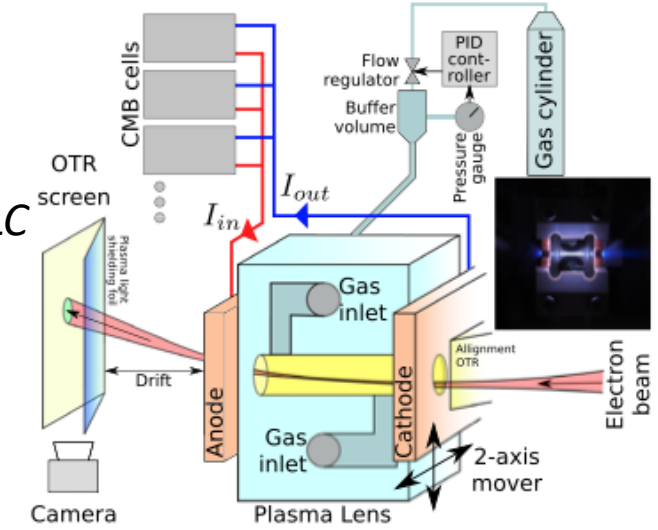
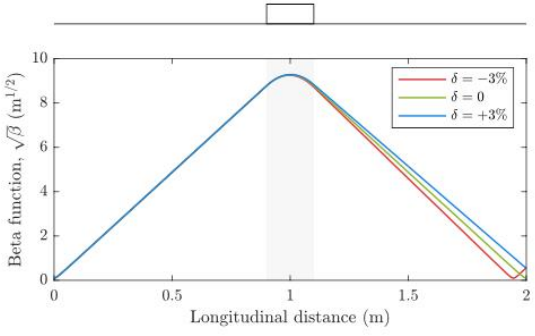


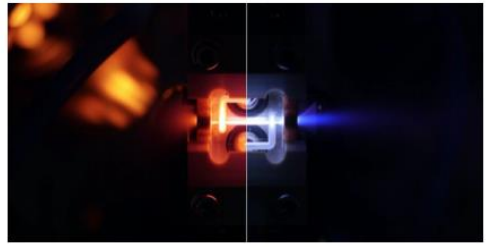
FIG. 1. Overview of the most relevant components of the CLEAR Plasma Lens Experiment and the path of the beam. Insert: Plasma lens capillary during a discharge.

[Sjobak, Lindstrom, Adli et al., Phys. Rev. Accel. Beams **24**, 121306 (December 2021)]



Chromaticity between stages.
From: Lindstrøm, PRAB 24, 014801 (2021).

Active plasma lenses



Plasma lens (left: helium, right: argon).
Photo by Kyrre N. Sjøbæk.