Science and Technology Facilities Council

vFFA

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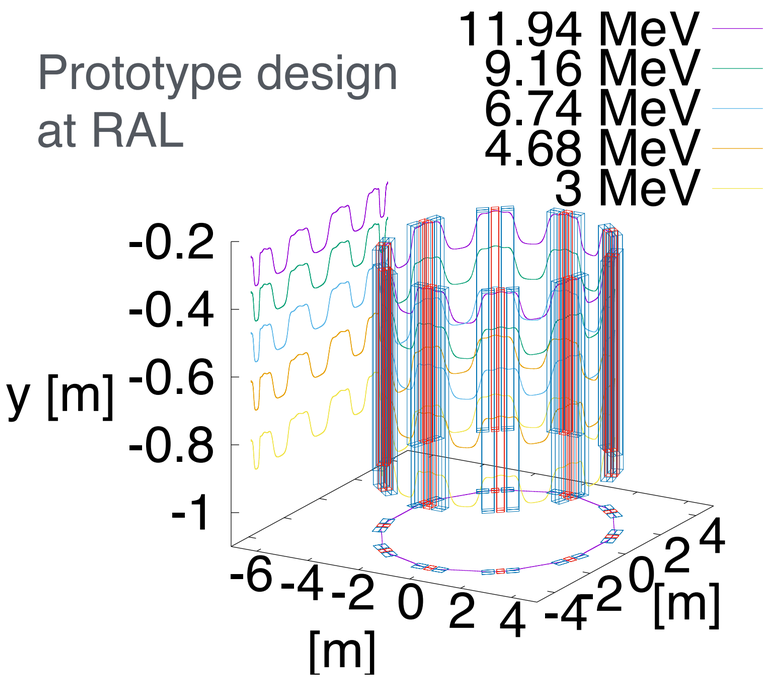
AF2 workshop

Vertical excursion FFA and novel optics

Prototype design at RAL



- Invented in 1955 by Tihiro Ohkawa.
- Re-invented in 2013 by Stephen Brooks.

- **Orbit moves vertically** when the beams are accelerated.
- Path length is constant for all the momenta. Momentum compaction factor is zero.
- Ultra-relativistic particles can be accelerated continuously with fixed field magnets.
    - As a proton driver for intensity frontier physics
        - **High rep rate** to increase average beam power.
        - **Energy efficient** accelerator with DC magnets.
        - Small footprint compare with a conventional FFA.
        - Simple rectangular magnet.
    - For muon acceleration
        - **No ramping of magnetic** fields.
        - No RF frequency modulation.
        - Large **momentum ratio from injection to extraction**, e.g. ~30.
        - Wiggling orbits to spread out neutrino.
- Lattice with only skew quadrupole (novel optics)
    - For muon collider arc
        - No reverse bend or no negative dispersion function is needed to **control momentum compaction factor.**

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