institut **Curie**

Imperial College London

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LhARA Proof of Principle

Beamline simulation and optimization

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Objective

Framework for beamline simulation and optimisation:

- Initial results using a quick code developed in Python for beam simulation for optimization purposes.
- Results confirmation using more accurate codes (BDSIM).

Python environment for simulation

- Developed by IC team: Matrix formalism for beam transport through a beamline with simple components: Drift, solenoid, quadrupoles, aperture/collimator.
- Obtention of particles' properties and general beamline characteristics.
- Plot of beam evolution: Riddhi Pullan and myself.

Plot of beam evolution

Existent utilities: particle trajectory tracing, transmission efficiency.
In development: Evolution of transverse phase space, emittance
and Twiss parameters for beam characterization.
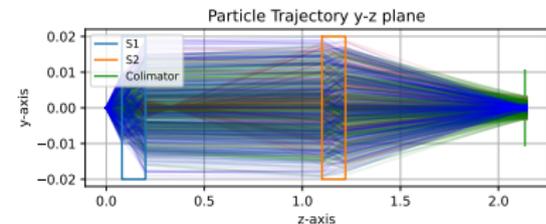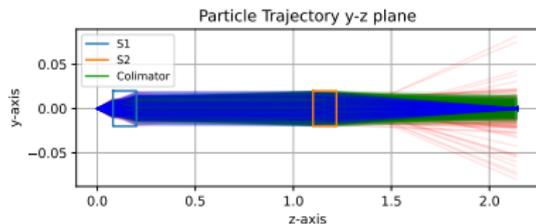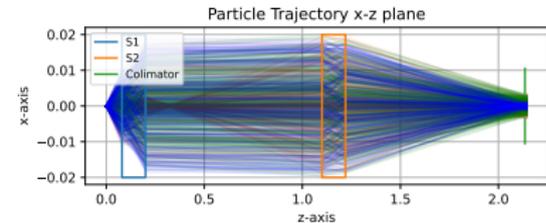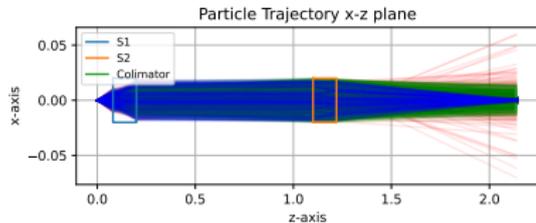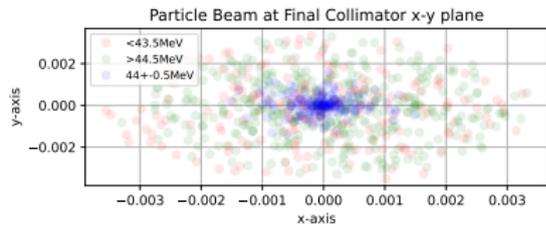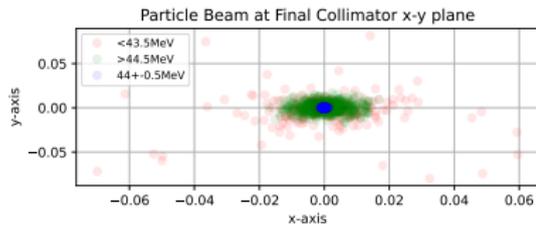
Example of usage in DRACO beamline:

Figure 1: Example of usage for particle trajectory for different energies using two solenoids (DRACO beamline) before and after a collimator at the target position.