



Development of magnetic system for bending electron beam in industrial accelerator ILU-10

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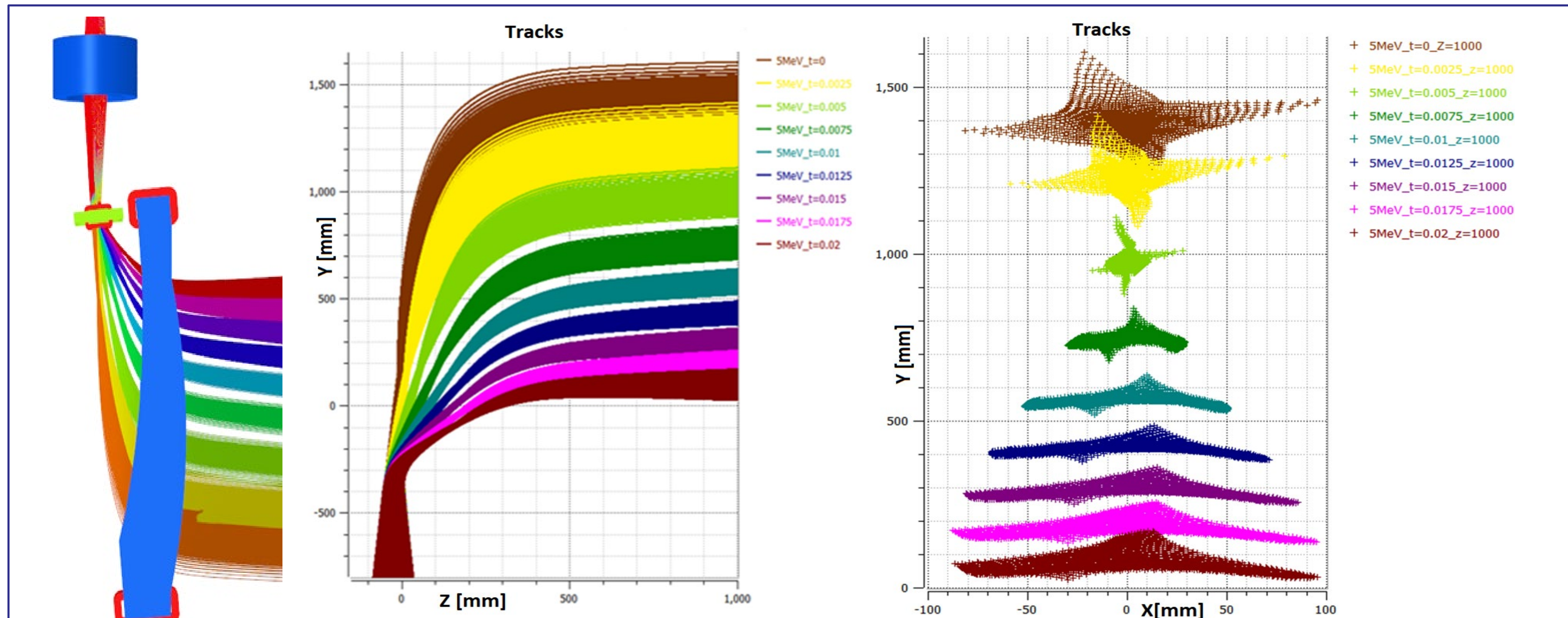
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Abstract

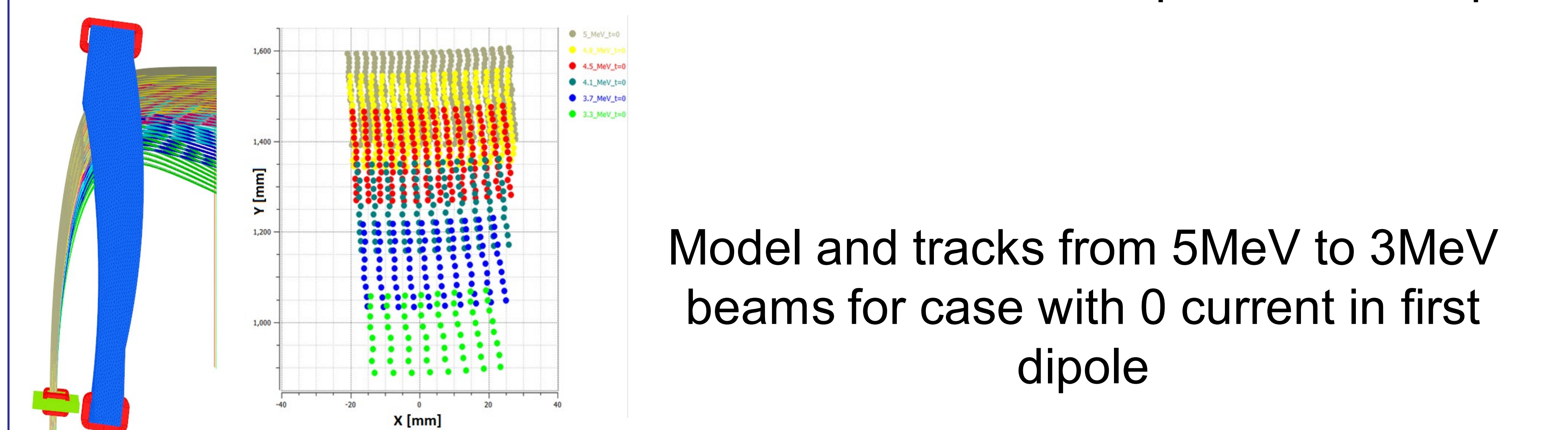
The ILU-10 accelerator has an operating energy range of 2.5–5 MeV. The available design allows to eject electrons only vertically. However, there is a demand for the ability to eject a beam bended at 90°.

There presents two ways to solve this problem. The first system consists of 2 dipole magnets. First dipole magnet already developed and used at the facility was taken. Due to the change in the current in the coils of the 1st dipole, the beam deflection angle changes. In the second dipole, the current is constant. The system can provide scan of 1500 mm.

Another system is based on the use of a magnetic mirror. The beam from the accelerating structure enters the magnetic lens, and then the focused beam enters the magnetic mirror. This one will operate on one current and rotate the particles at the same angle, regardless of their energies. The dipole magnet used on actual accelerator system can be applied to scan the beam.

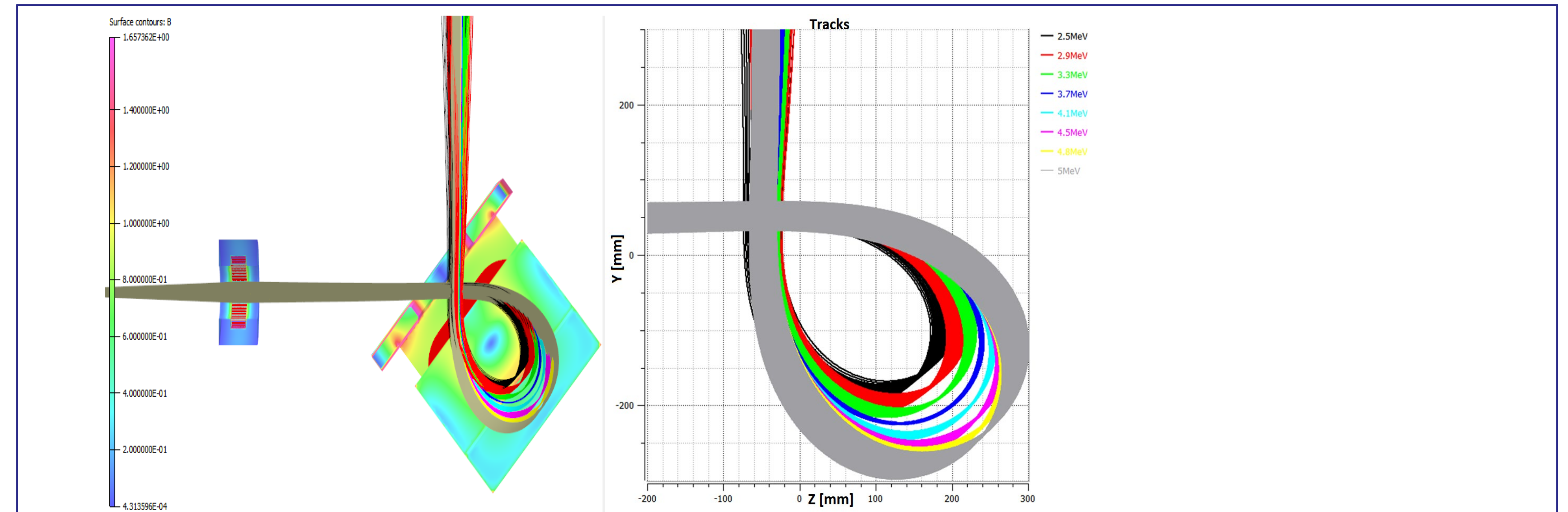


Model and tracks 5MeV beams for 0.02 s current impulse in first dipole

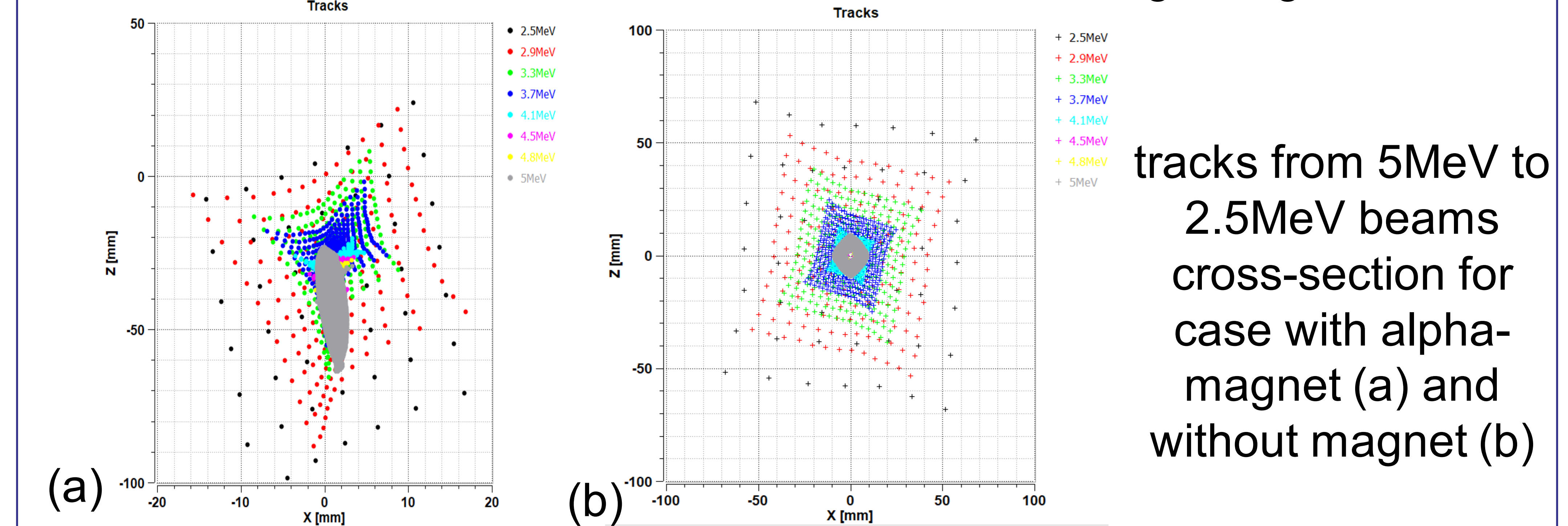


Model and tracks from 5MeV to 3MeV beams for case with 0 current in first dipole

First version of system



Model and tracks from 5MeV to 2.5 MeV beams through magnetic mirror



tracks from 5MeV to 2.5MeV beams cross-section for case with alpha-magnet (a) and without magnet (b)

Second version of system