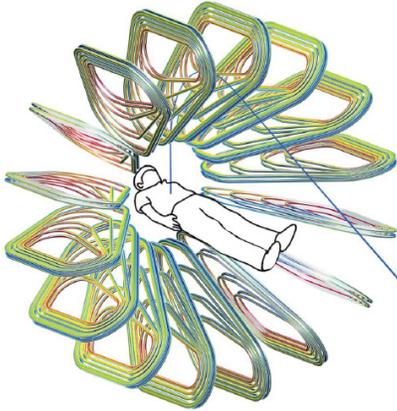


GATOROID



A compact and non-rotating gantry for charged particle therapy.

GaToroid is an innovative gantry design based upon a toroidal magnet concept, which eliminates the need to rotate the structure. The gantry comprises a set of discrete superconducting coils constituting the toroidal magnet, and a bending device at the entrance of the structure.

By selecting the impinging angle of beams with different momentum values, it is possible to reach different spots (if beams have same entry point) or to get a focusing effect (if beams enter the magnet from different angles).

GaToroid is meant to be lightweight: if used with proton beams, the structure would have an outer diameter of about 3.2m, for a total weight estimated around 12 tons. For carbon ion beams, the outer diameter would be of the order of 5m, for a total weight of around 50 tons. This represents a substantial weight reduction compared to conventional gantries, which weights around 100 tons for protons and over 350 tons for carbon ions.

Since this system works in steady state with no rotation, it can fully exploit the potential of superconductors, having no limitations by current or system's movement.

AREA OF EXPERTISE

- Magnet technology

IP STATUS

- Priority application (EP application nr. 18173426.0)
- PCT/EP2019/063152

TECHNOLOGY READINESS LEVEL

- Feasibility study

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Find out more at:
kt.cern

APPLICATIONS

- Charged particle therapy (protons and ions).

ADVANTAGES

- Non-rotating gantry, reducing the stability requirements, hence mass and footprint.
- Smaller and lighter gantry due to the use of superconductors.
- No magnetic field effect to the patient.
- Possibility to use different number of coils, corresponding to different angles of treatment.
- Operation in steady state, the speed of delivery only depends on the bending device.
- Fast switching of energy and direction.
- Possibility to perform sagittal and transverse painting for treatment.

LIMITATIONS

- Beam delivery only at specific angles

