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## Investigation on the spiral inflector and central region of the IsoDAR test bench cyclotron

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The IsoDAR project aims to perform searches for the sterile neutrino looking at intense neutrino source placed near the neutrino detector of Kamland. The neutrinos are produced by the collision between 10 mA proton beam and a target, leading to the generation and subsequent decay of  $^8\text{Li}$ . The proton beam will be produced by a cyclotron able to accelerate a 5 mA  $\text{H}^2+$  up to the energy of 60 AMeV. The  $\text{H}^2+$  ions will be extracted using an electrostatic deflector.

Due to the high beam intensity, the design of the injection and of central region is a key issue for the IsoDAR cyclotron since the space charge effects play an important role in the beam dynamics both along the injection line and the central region, included the spiral inflector.

As the beam injection and the central region are challenging items for IsoDAR cyclotron, a 1 AMeV test bench cyclotron is being designed to study and test either the beam injection from the ion source into the cyclotron and the acceleration in the first turns of the machine.

An overview of the IsoDAR test cyclotron is presented. In addition, the preliminary results of the simulations of the spiral inflector and the central region design for the test bench cyclotron, realized at IBA, are shown. Particular attention has been given to the space charge calculations during the present study.

**Primary author:** D'AGOSTINO, Grazia (LNS)

**Co-authors:** CALANNA, Alessandra (LNS); Dr FORTON, Eric (IBA); CALABRETTA, Luciano (LNS); Dr ZAREMBA, Simon (IBA); Dr NUTTENS, Vincent (IBA); Dr KLEEVEN, Willem (IBA)

**Presenter:** D'AGOSTINO, Grazia (LNS)

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