Sample Project: Mechanical design and analysis of an EBIS for production of light cancer therapy ions

Code	BE5382
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Department	BE
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Title

Mechanical design and analysis of an EBIS for production of light cancer therapy ions

Description

An Electron Beam Ion Source (EBIS) for particle-beam radiotherapy with carbon and other light ions is presently under development at CERN. The electron gun could also be utilized in charge breeders for nuclear physics facilities, such as HIE-ISOLDE and a future EURISOL. The key technology for the new EBIS is an innovative electron gun which is presently under construction. In order to fully utilize the potential of the new gun in medical and scientific applications a dedicated EBIS should be designed based on earlier R&D and expert knowledge on EBISes accumulated over the years by CERN and its collaborators. The 24 months project will be carried out in a small multidisciplinary team in close contact with various field experts available at CERN. The project consists of:

Mechanical design of the EBIS, including Finite Element (FE) simulations of structural mechanics, heat transfer and magnetic field calculations.

Mechanical design and FE simulations of magnetic fields for the ion extraction line.

Required knowledge of CAD (AutoCAD, Inventor) and FE analysis (structural mechanics, magnetic fields, thermal transfer). Various packages are available at CERN including COMSOL, OPERA and application-specific programs such as MolFlow, TRAK etc. Working language is English, knowledge of French is an asset.

Skills

Mechanical Engineering: Computer integrated/aided design, Heat Transfer, Numerical techniques and software (e.g. ANSYS, Abaqus...), Structural mechanics and machine development

Disciplines

Accelerator Physics, Mechanical Engineering