

Design of variable aspect ratio charged particle trap

Abstract

Successful long-time confinement of toroidal non-neutral plasma in tight aspect ratio geometries have been demonstrated. Role of tight aspect ratio on confinement is believed to playing a vital role. Keeping this in mind, a novel trap has been planned to conduct experiments where aspect ratio of the toroidal trap can be varied. Designing of a NOVEL variable aspect ratio (Ro/a - 1.5 to 3) toroidal trap by varying the outer and/or inner wall will be carried out in the project work. Toroidal trap of 315 degree arc length having maximum radius of 30cm shall be designed. Design includes the mechanical design of the trap, 3D model of the trap components, support structure of the trap components to keep them co-linear, and design of insulators for inter-components insulation for charged particle trap will be carried out by student using a sector of toroidal arcs of different toroidal lengths. Student will design these components while keeping practical constraints, i.e. ease of assembly and de-assembly components and ease of fabrication aspects of the experiment.

Academic Project Requirements:

1) Required No. of student(s) for academic project: 1

2) Name of course with branch/discipline: B.E./B.Tech. Mechanical Engineering

3) Academic Project duration:

(a) Total academic project duration: 20 Weeks

(b) Student's presence at IPR for academic project work: 5 Full working Days per week

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