

Student project proposal

Project title: Hyperloop reduced scale pod application, Design of the Linear Induction Motor (LIM)

Project type: MSc thesis, BA semester project, MSc semester project

Project responsible and e-mail

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Project description

The Hyperloop transportation system is composed by a constrained space characterized by a low-pressure environment (operated at approximately 50 mbar), that is usually represented by tubes/tunnels that also house a dedicated rail system responsible for the mechanical constraining of energy-autonomous vehicles (called *capsules* or *pods*) carrying a given payload. Hyperloop capsules are expected to be self-propelled and can use the tube's rail for guidance, magnetic levitation and propulsion purposes.

The goal of the present project is to design the Linear Induction Model (LIM). For that purpose a Finite Element Model (FEM) will be developed using ANSYS Maxwell. To allow an easy test and comparison of different configurations, the model will have to be parameterized. This will be done by using IronPython which is the scripting language used by ANSYS Maxwell.

The EPFL Distributed Electrical System Laboratory (DESL) is currently active in developing optimal sizing methods of the full-scale electrical propulsion system for Hyperloop capsules. The expected performance of the defined propulsions systems will be validated by means of a reduced-scale pod mock-up to be built at the EPFL. Within this context, we are looking for BA/Master EE students interested to work on the parametric design of the LIM by way of FEM especially applied the reduced-scale pod. In particular, the tasks of the student are listed here below.

Tasks of the student

- Design a LIM using ANSYS Maxwell
- Parameterization of the model to easily test and compare various configurations. This will be done by using the scripting language of ANSYS Maxwell which is IronPython.
IronPython is a declination of Python using .NET extensions
- Propose/choose a design for the reduced-scale pod mock-up.

Requirements

- The knowledge of FEM software or of python is NOT required. The student will learn those through the project
- Because of the previous point the student should be : able to work in team, committed and willing to learn