École Polytechnique Fédérale de Lausanne
Distributed Electrical Systems Laboratory
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# Student project proposal

*Project title*

**Design Optimization and manufacturing of a Linear induction motor for a hyperloop prototype**

*Project type*  ☐ MSc thesis  ☐ BA semester project  ☒ MSc semester project

*Project responsible and e-mail*
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*Project description*
The proposed project is framed within the activities of the propulsion team of the EPFL Hyperloop team (EPFLoop) and the collaboration of the HEIGVD Yverdon (Haute Ecole d'Ingénierie et de Gestion du Canton de Vaud. The project goal is to optimize a linear induction motor (LIM) existing design via finite element method simulations (Comsol) and to proceed with the manufacturing process.

The optimization consists of the minimization of the motor weight while keeping the same performance (in terms of thrust and levitation forces). Analysis and selection of the motor windings will have to be carried out too.

Once finalized, the student will have to design CAD drawings of the selected solution and proceed with the manufacturing process with our long-term industrial partners.

Multiple iterations for the winding manufacturing will have to be done through the construction of 3D printed samples of the LIM solution.

As an active member of the EPFLoop team, the students will be supposed to collaborate with other team members and to participate to the team regular update meetings.

*Tasks of the student*
- Ger familiar with current LIM f.e.m. models (COMSOL Multiphysics).
- Understand the magnetic processes taking place within the system.
- Understand the LIM winding layout.
- Design a CAD of the identified solution (used to produce the laminated iron core).
- 3D print multiple samples of the identified solution (for the winding production).

*Requirements*
- COMSOL.
- Any CAD design tool.
- 3D printer basic knowledge.
- Mechanical design.
- Electrical machines basic knowledge (expected to increase during the project).