TUM Hyperloop Levitation: Simulation and Testing of an Electrodynamic Suspension (EDS) Testbench

Type: Semester/Master's
Thesis Content: Theoretical and practical
Possible start: Now

TUM Hyperloop Program

Within the scope of the TUM Hyperloop Program, a full-scale Demonstrator for a climate-neutral, ground-based transportation system, meeting the demand for ultra-fast connections between mobility hubs, was developed. This prototype uses electromagnetic suspension and propulsion and operates in a partly evacuated environment to minimize friction.

Job Description

As part of the levitation sub team within the TUM Hyperloop team, you will be working alongside motivated students and researchers on our site in Ottobrunn. Your work will focus on the design and investigation of different conductive track geometries for an EDS test platform. This includes the design of track concepts, numerical modeling using finite element methods, and the practical implementation of the developed designs. The position combines engineering design, simulation, FEM analysis manufacturing support, and experimental testing. You will contribute to the full development cycle of the system, from concept and simulation to hardware realization, experimental validation, and technical documentation.
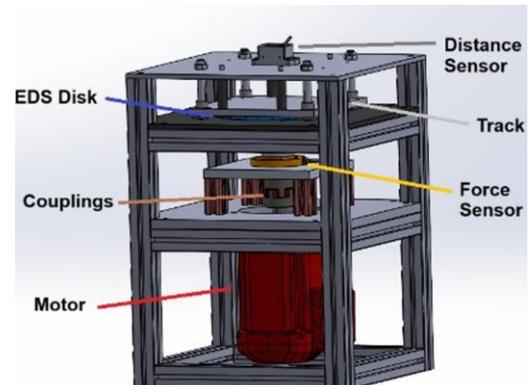
Your Tasks

- Understanding the basics of electrodynamic suspension (EDS).
- Designing and developing different conductive track geometries for the levitation system.
- Performing FEM simulations of track designs (e.g., using Ansys Maxwell or similar tools).
- Investigation and simulation of EDS system models: FEM and analytical approaches.
- Supporting the manufacturing and integration process of the designed track components.
- Conducting measurements and tests on the test bench and evaluating the results by comparison with the simulation results.

Our Requirements

- Readiness to learn and understand a new complex research topic in short time.
- High motivation and willingness to make an impact.
- Experience with <u>Ansys Maxwell</u>, Matlab Simulink and preferably SolidWorks.
- Experience with hardware (motors and sensors).

Our Offer

- Working with students in a highly motivated young research team.
- Getting experience in analysis, simulation and testing on a fantastic real-world problem.
- Helping to shape the next–generation passenger transport system.

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