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FUNDAMENTAL RESEARCH OF FERROFLUIDS

Abstract

HAMMER, High Applicability of Magnetic Motion Experimental Research, is a multinational fundamental research project conducted by students from Luleå University of Technology, LTU, Sweden. The

aim of the project is to investigate the applicability of ferrofluids and other fluids, that are susceptible to electro-magnetic fields, in space applications. The project started in October of 2021 and consists of 18 highly motivated students from 7 different nations all over the globe. The project is supported by the university and Giron Space Organisation, which is a student organisation at the Kiruna Space Campus of LTU.

The HAMMER project aims to contribute to the developing investigation of ferrofluids and their applications in space. This is to be done from experiments around the manipulation of ferrofluids on the ground to conducting more investigations on various different platforms, such as drop towers, parabolic flights, sounding rockets, free falling units etc. These are considered the most practical and informative methods to investigate the fluid behaviour in microgravity environments and space conditions. The future research direction will be derived from the results of the initial experiments. Already some potential has been envisioned, in areas such as attitude control, cooling systems, fuel transference etc., and the research is a great way for LTU students to explore them.

The project lays high emphasis on the public relations and is acquiring industrial support. The project is adhering to industry standards in space engineering and project management. The resources that LTU provides, such as access to space labs, clean room environments, and more, is very advantageous to the project in its entirety, and its objective to design and build and test its concepts. LTU also gives of support to student led projects by lecturers and professors throughout the projects lifetime. This paper focuses on the mission overview, the working process, and a technical description of the experiments and their analysis so far.