Impact of High-Energy Radiation on Fuel Cells in Aviation

Project Description

As air traffic continues to grow, carbon dioxide (CO_2) emissions from this sector are increasing at twice the rate of emissions in all other sectors worldwide. To achieve climate-neutral and carbon-neutral mobility, the development of new technologies is crucial, particularly in air transport. The powertrain is the primary source of CO_2 emissions in this sector due to the combustion of kerosene, making its development a priority. One promising solution is the use of electric powertrains based on fuel cells. However, accurate prediction of fuel cell degradation is essential to ensure safety in aviation and to enable the technology to be used in future air traffic. Especially the impact of cosmic rays on the fuel cell system is no longer negligible for aircraft applications and has to be studied in greater detail.

The main task of the thesis project is to develop a model which can predict the degradation of the fuel cell due to high energy radiation such as cosmic rays. This model will provide crucial insights into the behavior of fuel cells in cosmic ray environments, enabling the development of safer and more reliable technologies for future air traffic. The project will involve theoretical and optional experimental work to simulate and verify the model's predictions, and the results obtained will contribute to the advancement of fuel cell technology and its implementation in aviation.

Requirements

- Working independently with a teamwork mindset
- Basic knowledge of PEM fuel cells required
- Basic knowledge in Comsol, Matlab or Python helpful
- Very good knowledge of German or English, both written and spoken

Contact information

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