Fluid Dynamics Seminar

Date: Wednesday, January, 24, 2018 at 13:00
Location: ZARM, Room 1730

Measurement and prediction of micro nozzle thrust

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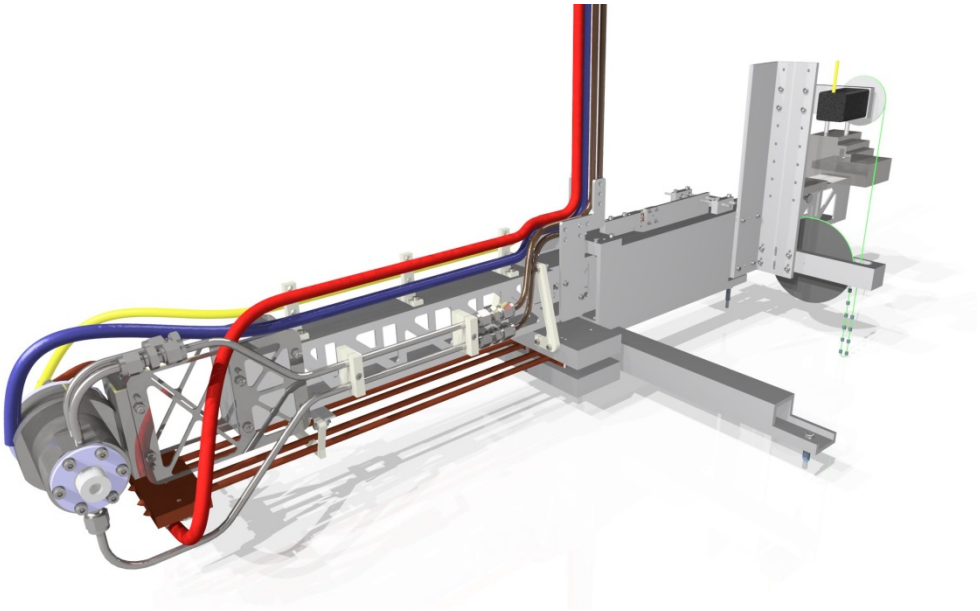

Fig: Rendered representation of the torsional thrust balance with mounted INGA IV thruster.

The development of electric propulsion systems for spacecraft applications demands for precise measurement and prediction of thrust in order to develop high efficiency devices. Miniaturization of these propulsion systems is a current challenge, for the creation of powerful yet economical devices, as well as to operate micro and nano satellites. To experimentally measure thrust of spacecraft propulsion systems, thrust balances are used and commonly designed to fit the special requirements of laboratory infrastructure and thruster physical properties. Despite ongoing research and steady improvements in numerical methods for the fluid dynamic investigation of the propulsion systems, experimental measurements are still a powerful tool to fully describe and specify the thrusters properties under realistic world conditions.

In my talk I give an overview on my experimental work and studies at ZARM. The currently investigated thruster setup and the experimental setup is briefly described. The development of a torsional sub milli-Newton thrust balance based on a spring leaf strain gauge sensor is presented. Experimental results for the thrust measurements of the INGA IV micro nozzle thruster operating in cold gas mode are presented and discussed with respect to the results of numerical simulations.