



Investigation of Electrostatic Accelerometer in HUST for Space Science Missions

Yanzheng Bai, Ming Hu, Gui Li, Li Liu, Shaobo Qu, Shuchao Wu, and Zebing Zhou
Huazhong University of Science and Technology, School of Physics, Wuhan, China (abai@mail.hust.edu.cn)

High-precision electrostatic accelerometers are significant payload in CHAMP, GRACE and GOCE gravity missions to measure the non-gravitational forces.

In our group, space electrostatic accelerometer and inertial sensor based on the capacitive sensors and electrostatic control technique has been investigated for space science research in China such as testing of equivalence principle (TEPO), searching non-Newtonian force in micrometer range, satellite Earth's field recovery and so on.

In our group, a capacitive position sensor with a resolution of 10^{-7} pF/Hz^{1/2} and the μ V/Hz^{1/2} level electrostatic actuator are developed. The fiber torsion pendulum facility is adopt to measure the parameters of the electrostatic controlled inertial sensor such as the resolution, and the electrostatic stiffness, the cross couple between different DOFs. Meanwhile, high voltage suspension and free fall methods are applied to verify the function of electrostatic accelerometer. Last, the engineering model of electrostatic accelerometer has been developed and tested successfully in space and preliminary results are present.