

# **STEP Accelerometer Response under Non-Equilibrium Conditions**

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The STEP (Satellite Test of the Equivalence Principle) accelerometer performance is derived under the assumption that the test mass is properly constrained and positioned (5DOF) in the housing cavity (test mass is in the operational “sweet-spot”). It is extremely useful to check system response when the mass is outside the “sweet-spot”. Using a 1m long fiber suspended test mass, we have made past studies on magnetic suspension forces ( $F_y$  and  $F_z$ ) and have explored the housing cavity in 3DOF ( $x$ ,  $y$ , and  $z$  translation), limited by uncertainty in test mass tilt angle ( $q_y$  and  $q_z$ ). To address this limitation, we have recently constructed a 2-axis cryogenic tilt platform. The laboratory version of position readout electronics allow us to measure the test mass position at 4K to a precision of 1 nm and tilt angle to less than 1 arc sec in 100 seconds. We will present recent experimental data showing the dynamic response of the capacitance measurement subsystem as a function of test mass position.