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PETER: a torsion pendulum facility to study small forces/torques on free falling instrumented masses

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We will describe realization and tests of a two stage torsion pendulum facility (nicknamed PETER, from Italian PEndolo Traslazionale E Rotazionale, namely translational and Rotational Pendulum) for the measurement of GRS actuation Cross Talks (CT) and its possible evolution. This project started within the ground testing activities for the characterization, before flight, of the Gravitational Reference Sensor (GRS) of LISA-Pathfinder, where it showed results consistent with what observed on flight. The apparatus could easily evolve to a facility to test small forces/torques on free falling instrumented masses, for future next generation space missions. Here, we will discuss the principle of operation of the double torsion pendulum and the initial goal of the activity, the description of the PETER apparatus, cross -talk measurement technique and results and possible extension to more than 2 DOF

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