

MICROSCOPE, Equivalence Principle Test with a Micro-satellite

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By taking advantage of the Cnes microsatellite line, the MICROSCOPE mission has been designed aiming at the test of the Equivalence Principle -identity of inertial and gravitational mass- with an accuracy of 10^{-15} . The two preliminary definition reviews performed in early 2005 for the satellite and its payload, have demonstrated the possibility to perform, on board a 200 kg drag-free satellite, the in orbit experiment of the universality of free fall with two orders of magnitude better than never performed. The instrument is designed around two pairs of masses made respectively of Platinum and Titanium alloys. The control of the masses, at the center of their silica cages by electrostatic field managed all around them, provides, not only the scientific data to verify their inertial motions when submitted to the same Earth gravity field, but also the data to compensate the satellite drag and to point accurately the satellite with respect to the Earth field. The satellite and the instrument, both closely cooperate to the experiment operation, calibration and performance and the tradeoffs presented in the paper show why it will be possible to detect an acceleration signal as low as a few 10^{-15}ms^{-2} .