

MICROGRAVITY SCIENCES AND PROCESSES (A2)  
Gravity and Fundamental Physics (1)

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PRE-FLIGHT VERIFICATION OF THE DIFFERENTIAL ACCELEROMETERS OF THE  
MICROSCOPE MISSION**Abstract**

The Microscope mission is fully dedicated to the in-orbit test of the Universality of free fall, the so-called Weak Equivalence Principle (WEP), with an expected accuracy better than 10<sup>-15</sup>.

The test principle consists in comparing the accelerations of two proof masses of different composition in an external gravitational field. The payload embarks two test-masses made of Platinum Rhodium and Titanium alloys acting as a sensing core of two coaxial electrostatic accelerometers and constrained to follow the same orbit.

The payload is currently undergoing qualification aiming at verifying and validating the healthiness of the Qualification Model after a series of environmental tests. Since the proof masses constituting the ONERA instrument can not be levitated under 1g, operational tests are performed after each environmental test at the drop tower facility of the ZARM Institute which is the only possible on-ground validation approach offering a microgravity environment to demonstrate the instrument capability to control the proof masses.

Not only those tests qualify the instrument but also provide a better assessment of its dynamical behaviour essential to a fine understanding of the Microscope mission challenges. At last but not least, the differential accelerometers can already exhibit high-g resolution within the duration of the free falls considered as a very-first preliminary scientific return.