Poster Session #B
Observational and space tests of gravitation

B05

MICROSCOPE : new improvement on the systematic error

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MICROSCOPE is a space mission that aims to test the equivalence principle with an accuracy of 10^{-15} on the Eötvös parameter. The equivalence principle is the main postulate of general relativity, it states the equivalence of the inertial and the gravitational masses. The satellite was launched in 2016 and decommissioned in 2018. Its instrument T-SAGE is composed of two differential accelerometers. The first one, SUREF, is composed of two test masses both made of Platinum and is used to test the consistency of the experiment and the data process. The second one, SUEP, used for EP test, is composed of an internal mass of Platinum and of an external mass in Titanium. In case of an EP violation, a signal is expected to appear at the frequency of Earth's gravity field modulation, called f_{EP}, on the differential acceleration of the two test masses. The first result published in december 2017 showed no evidence of violation higher than 1.3×10^{-14} at 1 sigma. The upper bound of the systematic error was evaluated of 71×10^{-15} and was compatible with this statistic error. 94% of this systematic error came from the evaluation of the upper limit of the instrument thermal variations. The result was obtained with only 7% of the data, thus an improvement of the statistical error is excepted with the analysis of the whole data and it becomes important to be less conservative in the evaluation of the systematic error. Several sessions were dedicated to the in-orbit estimation of the thermal sensitivity at a f_{sti} frequency (close to the f_{EP} frequency) related to the sensor unit or to the electronic unit. I have analysed these sessions by the mean of two different methods which provide coherent estimations of the thermal sensitivity. I have demonstrated that for 3 parts of the instrument the thermal sensitivity doesn't depend on the frequency, while for one part of the SUEP instrument we note a frequency dependency that we modelize by a first order filter. After a brief presentation of the MICROSCOPE mission, I will present the result obtained with these methods.