

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

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PROPOSED TESTS OF GENERAL RELATIVITY WITH THE GALILEO 5 AND 6 NAVIGATION
SATELLITES

Abstract

Einstein's theory of general relativity leads to various predictions that have already been verified by experiments with high precision, such as the perihelion shift of Mercury or the gravitational redshift. The best measurement of the gravitational redshift has been achieved with the Gravity Probe A experiment in 1976 with an uncertainty of 1.4×10^{-4} . Today, two of the Galileo navigation satellites provide us with an excellent opportunity to improve this uncertainty. GSAT0201 and GSAT0202 have accidentally been injected onto an eccentric orbit, so that the accurate, stable atomic clocks onboard experience a daily modulation of the gravitational potential resulting in a measurable dilation of time. Through an analysis of the data obtained by the satellites and by employing a sophisticated model for the influence of solar

radiation pressure on the satellites' orbits we aim to determine the time dilation to an improved accuracy. We are also investigating if further effects on the clocks of the satellites might be in the range of detection.

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