



Sonderkolloquium

Mittwoch, 10. April 2019, 10:30 Uhr

Dr. Sven Herrmann

*Experimental Gravitation and Quantum Optics,
Center of Applied Space Technology and Microgravity
ZARM, Universität Bremen*

*“A test of the gravitational redshift with Galileo
satellites 5+6”*

The European GNSS satellites Galileo 5 and 6 launched in August 2014 have not reached their targeted circular orbit at 22.000 km height. Instead, they have been accidentally injected into an eccentric orbit and after a series of correction maneuvers their orbits now possess an eccentricity of 0.16 corresponding to a periodic variation of altitude of about 8500 km. While this is of some disadvantage for navigation purposes, it offers a unique possibility to perform a precise test of the gravitational redshift as predicted by Einstein's theory of General Relativity. Thus, with support from the European and German space agencies ESA and DLR we have conducted an analysis of the clock and orbit data from these two satellites. Both satellites are equipped with passive hydrogen maser clocks and Rubidium atomic frequency standards. The modulation of these clocks' frequencies undergo due to the gravitational redshift is approximately $\Delta \frac{\nu}{\nu} = 1 \times 10^{-10}$. In my talk I want to show how this allows for an improved test of the gravitational redshift over the most accurate such test so far, obtained by the Gravity Probe A experiment in 1976. For that I will present an analysis of the data so far covering approximately 3 years and discuss the main systematic effects we have identified.

Seminarraum 021
IRIS Adlershof
Humboldt-Universität zu Berlin
Zum Großen Windkanal 6
12489 Berlin