



universität
uulm

Physikalisches Kolloquium
Einladung

Physics Colloquium
Invitation


Monday, 03 June 2024

BE AWARE - ROOM CHANGE Lecture Hall **O25/H2**, at 16:15
Coffee and cookies will be served in front of the lecture hall from 16:00

High Resolution Inertial Earth Sensing with Large Sagnac Interferometers

Prof. Dr. Ulrich Schreiber

TU Munich, Research Unit Satellite Geodesy
Geodetic Observatory Wettzell, Germany

 <https://www.asg.ed.tum.de/iapg/mitarbeiter/schreiber/>



Ring lasers are now resolving the rate of rotation of the Earth with 8 significant digits. Technically, they constitute a Sagnac interferometer, where a traveling wave resonator, circumscribing an arbitrary contour, defines the optical frequency of two counter-propagating resonant laser beams. Subtle non-reciprocal effects on the laser beam however, cause a variable bias, which reduces the long-term stability. Over the last two years, we have improved the performance of the G ring laser to the point, that we obtain long-term stable conditions over more than a year. Advances in the modeling of the non-linear behavior of the laser excitation process as well as some small but significant improvements in the operation of the laser gyroscope are taking us now right to the doorstep, where the periodic part of the Length of Day variation of the Earth rotation can be recovered. It is the first time that this has been achieved by an inertial sensing technique. This talk outlines the current state of the art of inertial rotation sensing in the geosciences and its challenges. Furthermore, we discuss promising ways for a further enhanced sensor stability. At this point in time there is no apparent fundamental limit of this technique in sight.



Host: Prof. Dr. Wolfgang Schleich, Institute of Quantum Physics

Organisation: Prof. Dr. Jens Michaelis, Institute of Biophysics, jens.michaelis@uni-ulm.de, +49-731-50-23050