Contribution ID: **36** Type: **Oral**

High Resolution Inertial Earth Sensing with Large Sagnac Interferometers

Thursday, 15 June 2023 09:00 (30 minutes)

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. This talk outlines the current state of the art of inertial rotation sensing in the geosciences. Furthermore, we discuss the next steps for a further enhanced sensor stability. At this point in time there is no apparent fundamental limit of this technique in sight.

Primary author: SCHREIBER, Ulrich (Technical University of Munich)

Co-authors: Dr KODET, Jan (Technical University of Munich); Dr KLÜGEL, Thomas (Federal Agency of Cartography and Geodesy)

Presenter: SCHREIBER, Ulrich (Technical University of Munich)

Session Classification: Large Laser Gyroscope

Track Classification: Status of large frame Ring Laser Gyroscopes