



Multi-Components Large Ring Laser Gyroscopes for the Geosciences

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Sagnac interferometers have established themselves firmly in the Geosciences, so that we can now begin to separate and mitigate error sources that are not related to the rotation sensing process from the Sagnac interferogram. As a result of that we were able to reduce the measurement error of the 16 m² G ring laser of the Geodetic Observatory Wettzell by a factor of more than two. At the same time the residual sensor drift reduced significantly.

Until now most of the investigations on large ring laser gyroscopes were dealing with a single component ring laser, orientated horizontally on the ground. Over the last two years we have constructed the 4 component ring laser structure, which is arranged in the form of an inverted tetrahedron with the tip in the ground. For the first time this arrangement can provide three dimensional rotation measurements with additional redundancy.

On this road of a high resolution monitoring of a global measurement quantity (Earth rotation) with a local sensor (ring laser), we have encountered a number of serious challenges. This talk illustrates the recent progress in high resolution Sagnac Interferometry and its application to the Geosciences.