Abstract for microWOPM:

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Precise positioning of vehicles is essential for modern mobility solutions. In the case when GPS signals and other systems are temporarily unavailable, high performance inertial sensors become a key component of navigation systems that widely use dead reckoning i.e. localization based on a previously determined position and precise directional sensor signals from accelerometers and gyroscopes.

Using magnetic shielding, highly sensitive optical Magnetometers [1, 2] can become precise gyroscopes that can measure the rotation rate of the entire system with much less bias drift and higher precision as compared to state of the art MEMS gyroscopes [3, 4].

We present a system model based on MATLAB and Simulink, which simulates the data of a Gyroscope based on Rubidium and two Xenon Isotopes. Further, the Model includes the electronics and feedback loops, which represent a key component for the sensor operation. MATLAB and Simulink allow the numerical solution of the Optical Bloch Equations for arbitrary fields, this allows parameter studies and signal optimization for arbitrary system conditions. The use of numerical solutions does not rely on a Steady State; therefore, we can also obtain insights into the fast dynamics of processes like spin polarization and precession.

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