Quantum inertial sensor technologies leading to innovative high precision and downsizing of self-localization units

Development of high-performance gyroscopes with matter waves

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Summary :

Vehicle position can be estimated by using both accelerometers and gyroscopes. Such estimation on the self-position is called the inertial navigation which enables supplementing the Global Positioning System (GPS) or Quasi-Zenith Satellite System (QZSS) vulnerable to radio disturbance. Proof-of-concept (POC) of this project is to implement high-performance of inertial navigation system applicable to a self-driving car, an autonomous ship, and also seabed resource exploration.

Currently, the accuracy of the inertial navigation is restricted by the Allan variance of a gyroscope. In this project, the performance of gyroscope that can be mounted on various vehicles is drastically improved by using quantum de Broglie wave instead of the classical light wave.

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