

Gyroscope Based on NV Color Center in Diamond

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A rotation sensor is one of the key elements of inertial navigation systems and complements most cellphone sensor sets used for various applications. Currently, inexpensive and efficient solutions are mechano-electronic devices, which nevertheless lack long-term stability. The lack of such stability comes from the ageing of the device and degradation/change of the artificially created features of micromechanical device. Much like it was done in case of frequency measurements, length and mass, there is need it creating device base on properties of elementary particles. Such a device may become a drift-free alternative to micromechanical devices. Here, we carry out a proof-of-concept experiment, demonstrating rotation measurements on a rotating setup utilizing nuclear spins of an ensemble of NV centers as a sensing element with no stationary reference. The measurement is verified by a commercially available MEMS gyroscope.