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Quantum Spin Gyroscope using NV centers in Diamond JEAN-CHRISTOPHE JASKULA, KASTURI SAHA, ASHOK AJOY, PAOLA CAPPELLARO, MIT — Gyroscopes find wide applications in everyday life from navigation and inertial sensing to rotation sensors in hand-held devices and automobiles. Current devices, based on either atomic or solid-state systems, impose a choice between long-time stability and high sensitivity in a miniaturized system. We are building a solid-state spin gyroscope associated with the Nitrogen-Vacancy (NV) centers in diamond to overcome these constraints. More specifically, we will take advantage of the ^{14}N nuclear spin coherence properties of NV centers and side-collection techniques to achieve high sensitivity of about $1 \text{ (mdeg s}^{-1})/\sqrt{\text{(Hz mm}^3\text{)}}$. Moreover, by exploiting the four classes of the NV axes, we will be able to determine axis of rotation as well as its rate.

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