

# Developing Diamond-Based Orientation Sensing for Cell Dynamics and Mechanics

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The optical properties of nitrogen vacancy (NV) centers in diamond are sensitive to their spin states, making NV centers effective quantum sensors for applications ranging from condensed matter physics to biomedicine. The long spin coherence time of NV center electrons makes them particularly attractive in biological applications. NV centers are sensitive to the magnetic field projected along the NV axis, so any changes in the orientation of a diamond sample containing NVs would cause detectable modulation in its optically detected magnetic resonance spectrum. This method is known as vector magnetometry and offers excellent spatial resolution and measurement sensitivity for determining the orientation changes of NVs in the diamond sample. In this talk, we discuss the development of nanodiamond (ND)-based orientation sensing for studying cell dynamics and mechanics. Examples include live cell plasma membrane dynamics and single-cell elasticity.

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