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Potential of diamond quantum sensors based on spin-qubits of NV centers

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Abstract

Solid-state quantum sensors using diamond and SiC are expected to have various applications due to their fundamental possibilities such as wide dynamic range, operating temperature range, and high spatial resolution.

In the MEXT Q-LEAP quantum solid-state sensor flagship project, five academia, two national research institutes, and four companies have joined forces to develop solid-state quantum sensors from fundamental science to prototype applications in quantum physics, materials, and sensor systems.

In this talk, I would like to show the latest research topics of Q-LEAP, including high-quality quantum materials, high-sensitivity magnetometers, and compact sensor modules. Additionally, I will introduce sensor systems for biological/medical applications and battery/power electronics. Furthermore, I will discuss the expectations for a future “quantum leap” society based on quantum solid-state sensor technology.