

# Abstract

## **Sensing of magnetic fields from live mammalian muscles using NV centers in diamonds.**

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The ability to sense signals originating from living subjects, such as the propagation of action potentials in neurons or in muscles, is fundamental for the understanding of underlying biological processes and the development of biomedicine and physiology. Traditional sensing of biophysical signals is achieved with the use of electrodes that have poor spatial resolution and cannot easily detect signals generated deep within the tissues without being invasive. Sensing magnetic fields induced by electrical currents in tissues is a viable alternative, providing comparable information but without direct contact with the specimens. Such measurements are currently performed with cryogenically cooled superconductors or bulky detectors with high costs and limited spatial and temporal resolution. In this talk I will explain and provide results about magnetic sensing of biological signals using NV centers in diamonds; a novel technique that provides high spatial resolution and high sensitivity. We particularly report the magnetic detection of action potentials optically induced on genetically modified tissue [1], and compare the results to the traditional recording with probe electrodes.

## **Reference**

[1] J. L. Webb, L. Troise et al., Detection of biological signals from a live mammalian muscle using a diamond quantum sensor, arXiv:2008.01002