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Biomedical engineering basics for diamond quantum relaxometry

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Prepositions

1. Nitrogen-Vacancy (NV) centers in diamond are versatile sensors suitable for quantum sensing in biological media.
2. The longitudinal relaxation time of an NV center ensemble can be coupled to a target spin using a magnetic field.
3. Coupling a magnetic field gradient with an NV center ensemble enables a spectroscopic technique with unprecedented speed.
4. Implementing the aforementioned spectroscopic technique requires accounting for spatial inhomogeneities.
5. A diamond sensor can host an artificial lipid bilayer.
6. In-situ diagnosis of lipid peroxidation of an artificial lipid bilayer is possible by measuring the longitudinal relaxation time of an ensemble of NV centers in diamond.
7. A diamond surface can be reversibly modified by means of a shielded plasma gradient, as evident in the mapping of the relaxation times.
8. Whatever levitates our minds (Degs – Levitate your mind)