

NV Center Detection modalities: QBP would take advantage of several NV -based sensing protocols. Ramsey interferometry would investigate low frequency noise of slow conformational drifts. Spin's echo sequences (Hahn Echo, CPMG) would investigate the decoherence time and filter almost static noise, revealing the spectral density of faster critical fluctuations for catalysis. Relaxometry, especially close to the cornering state crossing level (GSLAC), provides extreme sensitivity to GHz frequency magnetic noise, potentially from electron rotation dynamics during load transfer events. The correlation between these different measurements would provide a rich and multidimensional view of the decoration landscape.

Beyond Enzymes: Although enzymes are an ideal initial test bed, the concept of decoherence mechanism can be applied to higher order processes. The dynamics of ion channels, crucial to neural signaling, can be governed by a similar principle, where the quantum state of a selectivity filter collapses in a structured way upon interacting with an approaching ion. At the highest level, theories of consciousness, such as the Orch OR model, propose a role for the controlled collapse in micro-tubules. The QBP methodology, in principle, can be adapted to investigate these systems, providing a unified experimental framework to test quantum effects across biological scales.