# A quantum coherent spin in a two-dimensional material at room temperature

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Quantum networks and sensing require solid-state spin-photon interfaces that combine single photon generation and long-lived spin coherence with scalable device integration, ideally at ambient conditions. Despite rapid progress reported across several candidate systems, those possessing quantum coherent single spins at room temperature remain extremely rare.

In this talk, I will show new results of quantum coherent control under ambient conditions of a single-photon emitting defect spin in a two-dimensional material, hexagonal boron nitride. I show that the carbon-related defect has a spin-triplet electronic ground-state manifold and that the spin coherence is governed predominantly by coupling to only a few proximal nuclei and is prolonged by decoupling protocols. I will present our understanding of the optical and spin level structure, and how the specific optical rates we uncover for this system have important implications for potential quantum sensing applications.