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Quantum defects in solids for quantum information networks[1]

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Defects in crystals are leading qubit candidates for quantum entanglement networks, but progress in developing practical devices depends on the feasibility of device integration. We introduce our photonics platform which integrates near-surface nitrogen-vacancy (NV) centers in diamond into gallium phosphide (GaP) photonic circuits for photon-mediated spin-spin entanglement. We present our results in efficient single photon collection and routing, quantum emitter frequency control, and frequency conversion as well as paths forward which may include adopting new defect platforms.

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