Quantum Dots for all-photonic repeater states

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Quantum dots have long been proposed as excellent sources of single and entangled photons for use in quantum networking. Particularly promising are proposals for all-photonic repeater graph states, generated from spin-photon entanglement interfaces. However, less well considered are the challenges of achieving very high extraction efficiency photonic structures that also preserve photon purity, indistinguishability, extraction efficiency and spin-photon entanglement fidelity. I will discuss in particular how photonic cluster states, useful in quantum networking, have strict limits on photon clock rate. I will then outline the latest achievements in broadband photonic devices that meet all these requirements simultaneously. Finally I will also briefly discuss the challenge of interfacing QD photons with quantum memories, particularly considering bandwidth differences of each.