Growth of Self-Assembled Quantum Dots for Quantum and Photonic Applications

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Self-assembled quantum dots exhibit atomic like energy transitions, which can be used in quantum information applications. The ability to tune the quantum dot size, density and composition through the epitaxial growth process allows tailoring of their properties to access important technological wavelengths such as the optical fibre absorption windows. Challenges in terms of wavelength tunability, spectral purity and subsequent integration of these quantum dots into devices based on micropillars, p-i-n diode structures and photonic crystal or waveguide technologies will be discussed along with approaches to site controlled growth to achieve scalability.