The latest (monolayer WSe_2) and greatest (InGaAs quantum dots) in solid-state quantum emitters.

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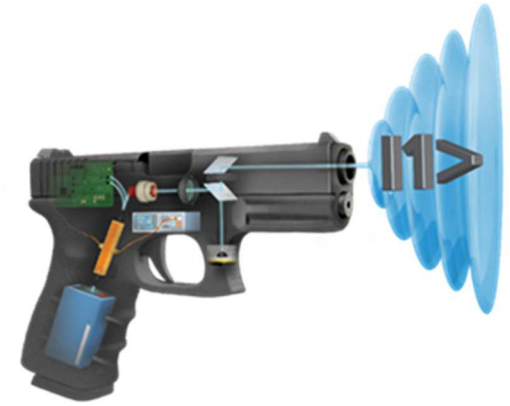
Motivated by potential technologies that exploit quantum mechanical superposition and entanglement, I will present our recent progress in the application of quantum optical techniques to coherently probe and manipulate solid-state quantum emitters. I will first discuss resonance fluorescence from single self-assembled InGaAs quantum dots, focusing particularly on the generation of ultra-coherent, indistinguishable photons in spite of the presence of environmental noise induced by nearby fluctuating nuclear spins or electronic charges. I will then present recent work on a "new" quantum emitter: a localised exciton in a WSe_2 monolayer. Such a two-dimensional transition metal dichalcogenide semiconductor is an intriguing host for a quantum emitter due its unique optical, electronic, and structural properties. I will show how such emitters can be both spatially and spectrally localised via strain gradients and probe their magneto- and quantum-optical properties. These results raise the prospect to deterministically strain-engineer arrays of quantum emitters in two-dimensional semiconductors.



Prof. Brian Gerardot leads the Quantum Photonics Laboratory at Heriot-Watt University. He obtained a BSc in Materials Science from Purdue University and a PhD from UC Santa Barbara. Following this, he moved to Heriot-Watt as a post-doctoral researcher. Subsequently, he has held Fellowships from the Royal Society of Edinburgh and the Royal Society and ERC Starting and Consolidating Grants. He became a Lecturer in 2009, a Reader in 2011, and Professor in 2013.