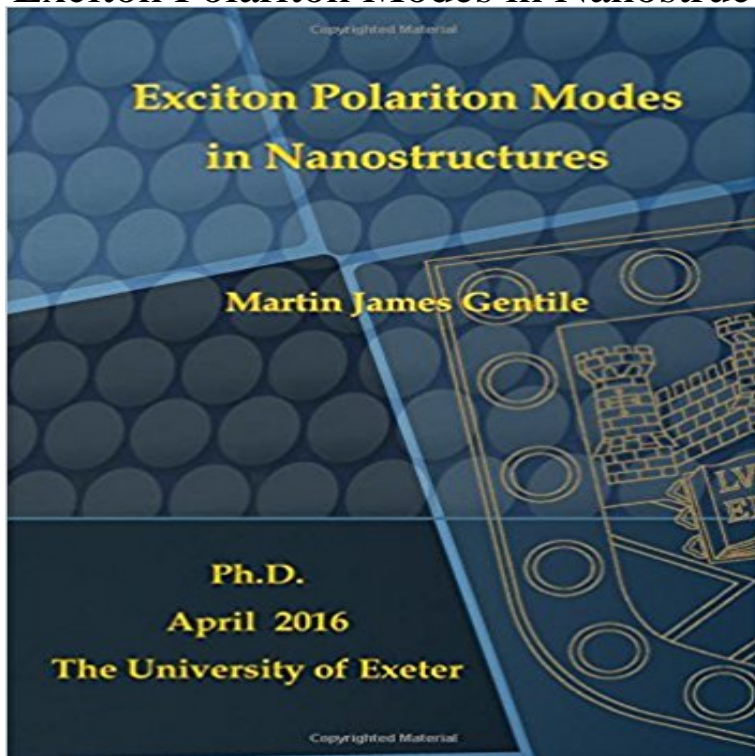


# Exciton Polariton Modes in Nanostructures



In this thesis, original theoretical and numerical investigations into the interaction of light with excitonic nanostructures are presented, in a bid to demonstrate that excitonic nanostructures are viable alternatives to the use of plasmonic nanostructures where electric field enhancement and confinement are sought. In particular, the field enhancement and confinement around excitonic nanostructures on resonance is shown to be comparable if not in excess of that around noble metal nanoparticles such as gold and silver. These excitonic modes, when set in the context of a core-shell geometry, are shown to offer tunability through nanoparticle design and through the index of the environment. In addition, hybrid hyperbolic and plexcitonic modes are shown to offer similar properties in metallic-excitonic nanostructures. Altogether, these excitonic and hybrid excitonic modes are shown to have potential in nanophotonic applications.

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