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The Calculation of the Electronic Structure and Surface Plasmon for Semiconductor Quantum Dots CHIN-SHENG WU, Yuan Ze University, Taiwan — The surface conduction electrons of semiconductor quantum dots provide the collective excitations. The frequencies of emitted laser increase as the size of the quantum dots decrease. The size of the laser crystal can be controlled during synthesis so that the excitation and emission of the quantum dots are highly tunable. In order to understand their relation we have to find the electronic structure of the quantum dot first therefore the Kohn-Sham self- consistent method is used. The introduction of the electronic density directly into the macroscopic dielectric constant is used as a means of calculating the plasmon frequency of inhomogeneous electronic systems. Multi-step spatial dependent dielectric constant of quantum dot permits an estimate of the frequencies of these surface plasmon. The complete optical calculation requires the solution of Maxwell's equations and the usual boundary conditions. The most significant feature of these profiles for this calculation is the increase plasmon frequency with decreasing dot size.

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