

Electron-Electron Interaction in Semiconductor Quantum Nanostructures

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This bachelor's thesis discusses electron-electron interaction in semiconductor quantum nanostructures, specifically in $(\text{Al}_x\text{Ga}_{1-x})_2\text{O}_3/\text{Ga}_2\text{O}_3$ quantum dots. The use of the Pöschl-Teller realistic potential to describe single-particle states is presented, and the Hartree method for investigating electron-electron interaction is discussed in detail. The thesis provides the results of self-consistent field (SCF) calculations for the Helium atom, which confirms the accuracy of the methodology used. Special attention is paid to studying the influence of quantum dot size variations on electron-electron interaction, which is controlled by the potential's α parameter.