

Theoretical Exposition of A Single Electron Quantum Dot

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Abstract	<p>This paper will review atomic-like phenomena in a semiconductor quantum dot which their size, shape and interactions can be precisely controlled through the use of nanofabrication technology. It has been shown that by confining electrons in three dimensions inside semiconductors, quantum dots can show many of the phenomena observed in atoms and nuclei and so called artificial atom. Because of its controllable system, it is possible to explore the correlation effects in regimes that cannot otherwise be accessed in other physical systems. For simplicity, this work will focus on a circular-shape single electron quantum dot trapped by polar two-dimensional harmonic potential in the presence of an external magnetic field. Both Zeeman splitting and spin orbit interaction are neglected in our calculation. The calculation show that Fock-Darwin spectrum will enter Landau regime, where when cyclotron frequency is much larger than potential confinement .</p>
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Author	WAHYU TRI CAHYANTO, S.Si, M.Si, Ph.D