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Physics of the *Artificial Atoms*:
Quantum Dots in a Magnetic Field

by

TAPASH CHAKRABORTY

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Physics of the *Artificial Atoms*: Quantum Dots in a Magnetic Field

Rapid advances in submicron technology have led to the fabrication of quasi-zero-dimensional electron systems which allow us to study the physics of a few-electron system under quantum confinement and in a magnetic field. The purpose of this review is to discuss the experimental and theoretical information currently available in the literature on this system. We also highlight current trends in the field and point out some of the questions which need to be answered.

I. INTRODUCTION

Quantum dots (quasi-zero-dimensional electron systems) are one of the most interesting systems in semiconductor nanostructures and have received considerable attention recently.^{1,2} With today's rapid advances in microfabrication technology, it has been possible to confine laterally the two-dimensional electron system (2DES) into dots of diameters below 100 nm. Since the mean free path of electrons at low temperatures is larger than this width, transport and optical properties of the electron systems in the dot should exhibit quasi-zero-dimensional behavior. Each dot typically contains between 1 and 200 electrons. These quantum confined few-electron systems are often referred to as *artificial atoms* where the potential of the nucleus is replaced by an artificially created potential.

Besides being an interesting physical system where new physical

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