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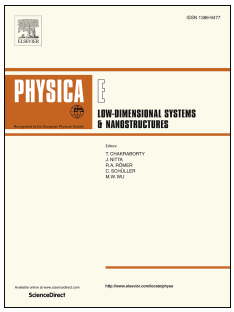


A comparative study on heat capacity, magnetization and magnetic susceptibility for a GaAs quantum dot with asymmetric confinement

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ACCEPTED MANUSCRIPT

# A comparative study on heat capacity, magnetization and magnetic susceptibility for a GaAs quantum dot with asymmetric confinement

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**Abstract**

In this work, thermal and magnetic properties for an electron with cylindrical confinement in presence of external electric and magnetic fields have been investigated. It was found that the corresponding time-independent Schrödinger equation can be separated into the product of the radially symmetric and an axial equation. Moreover, a quasi-exact expression for the energy spectrum of the system has been obtained in terms of the exact solutions for the radial equation and an approximation up to first order for the axial equation. The well-known thermal and magnetic properties as the heat capacity, magnetization, and the magnetic susceptibility have been analyzed via the canonical partition function. It was disclosed that the results for thermal and magnetic properties differ significantly from results previously obtained by others authors (by Gumber *et al.* ). Moreover, these results are in agreement with the diamagnetic properties of GaAs.

*Keywords:* thermal properties, magnetic properties, gallium arsenide, quantum confinement

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