

# Phonons In Semiconductor Nanostructures Nato Science Series E

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experimental observations of confined phonons and electron-phonon interaction in two-dimensional systems, elementary excitations in nanostructures, phonons and optical processes in reduced dimensionality systems, phonon limited transport phenomena, hot electron effects in quasi - 1D structures, carrier relaxation and phonon bottleneck in quantum dots.

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phonon interaction in two-dimensional systems, elementary excitations in nanostructures, phonons and optical processes in reduced dimensionality systems, phonon limited transport phenomena, hot electron effects in quasi - ID structures, carrier relaxation and phonon bottleneck in quantum dots.

### **Phonons in Semiconductor Nanostructures | SpringerLink**

(ABSTRACT) This NATO Advanced Research Workshop on 'Phonons in Semiconductor Nanostructures' recounts the latest developments in the physics of phonons and their impact on the electronic properties of low dimensional structures. Leading experts in the field discuss recent problems on phonon confinement and assess the increasing importance of phonon effects on the optical and transport properties of one and zero-dimensional structures.

### **Phonons in Semiconductor Nanostructures (eBook, 1993**

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## **Phonons in semiconductor nanostructures (Book, 1993 ...**

The critical role of phonons in semiconductor nanoscale devices is well known and a key goal of this book is to describe tractable models of confined phonons and how they are applied to calculations of basic properties and phenomena of semiconductor heterostructures.

## **Phonons in Nanostructures: Stroscio, Michael A., Dutta ...**

The continuing progress in the fabrication of semiconductor

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nanostructures with lower dimensional features has led to devices with enhanced functionality and even novel devices with new operating principles. The critical role of phonon effects in such semiconductor devices is well known.

## **Phonons in Nanostructures by Michael A. Stroscio**

Recent work on phonon assisted optical properties of semiconductor nanostructures is reviewed briefly. For quantum wells these properties include electron relaxation, infrared absorption, temperature dependent exciton linewidths, and phonon assisted exciton absorption and emission.

## **Phonon Assisted Optical Properties of Semiconductor ...**

thermoelectrics, as shown in Fig. 2. Most semiconductor devices contain nanostructures with dimensions smaller than the mean free path (MFP) of thermal phonons, which are defined as phonons that mainly contribute to heat transfer. Therefore, the

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classical model of heat diffusion, known as Fourier law, cannot describe the heat transport in the nano-

## **Thermal phonon engineering by tailored nanostructures**

The anharmonic decay of longitudinal-optical (LO) phonons in zinc-blende semiconductors has been studied. Based on an approach in which the anharmonic crystal potential is estimated using the theory of elasticity, the lifetime of LO phonons via emission of two acoustic phonons is calculated as a function of lattice temperature and phonon wave vector. Application of this model to bulk GaAs ...

## **Theoretical calculation of longitudinal-optical-phonon ...**

This NATO Advanced Research Workshop on Phonons in Semiconductor Nanostructures was a forum for discussion on the latest developments in the physics of phonons and their impact on the electronic properties of low-dimensional structures. Our

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goal was to bring together specialists in lattice

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Phonons in elemental 2D hexagonal crystals consist of six modes since there are two atoms per unit cell and modes transverse to the plane exist. Of these, three modes are acoustic and three are optical. For graphene, two of the modes are purely out-of-plane and have been labeled as out-of-plane or transverse.

## **Phonons - an overview | ScienceDirect Topics**

Phonons manifest themselves practically in all electrical, thermal, optical and noise phenomena in semiconductors. For example, acoustic and optical phonons limit electrical conductivity. Optical phonons strongly influence optical response of semiconductor bulk materials and nanostructures, while acoustic phonons are the dominant heat carriers in



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## **NANOPHONONICS FINE-TUNING PHONON DISPERSION IN**

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Phonon-Assisted Electro-Optical Switches and Logic Gates Based on Semiconductor Nanostructures. Zhengping Shan. Key Laboratory for Micro-Nano Physics and Technology of Hunan Province, College of Materials Science and Engineering, Hunan University, Changsha, 410082 China.

## **Phonon-Assisted Electro-Optical Switches and Logic Gates ...**

of anharmonic decay of optical phonons in semiconductor nanostructures D Datta, K Krishnababu, M A Stroschio et al.-Recent citations - J. Khurgin and D. Jena Phonon Anharmonicity in Few-Layer Black Phosphorus Damien Tristant et al-The role of intervalley phonons in hot carrier transfer and extraction in type-II InAs/AlAsSb quantum-well solar cells

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## **Journal of Physics: Condensed Matter LETTER TO THE EDITOR ...**

Recent studies suggested that phonons with extra large MFP contribute substantially more to thermal conductivity than previously believed (40% for Si near RT with MFP above 1  $\mu\text{m}$  ). Importance of long wavelength phonons: Conclusive experimental evidence of acoustic phonon confinement in individual free-standing nanostructures was missing.

## **Engineering the Phonons - Balandin Group**

Particularly, this dissertation emphasizes advancing understanding of the mean-free-paths (i.e., the distance phonons propagate without being scattered) of acoustic phonons, which are the dominant heat carriers in most crystalline semiconductor nanostructures.

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