Advanced Lecture on Semiconductor Nanotechnology

2 units (selection)

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Target〉 This class introduces basic principles of the semiconductor nanotechnology and their application to the quantum devices.

Outline〉 Basics of semiconductor physics and quantum mechanics are introduced to understand material properties of quantum confined nanostructures. Recent progress in fabrication techniques and device applications of semiconductor nanostructures (quantum wells, wires and dots) will be reviewed.

Style〉 Lecture

Keyword〉 ***quantum confined nanostructures, semiconductor nanoscience, electron devices, photonic devices***

Requirement〉 None.

Notice〉 None.

Goal〉 To understand basic properties of semiconductor nanostructures and quantum devices.

Schedule〉

1. Introduction to semiconductor nanostructures
2. Electronic states in quantum confined structures
3. Electrical properties of superlattices
4. Fabrication technique of quantum wires and wells
5. Characterization of heterointerfaces
6. Characterization of nanostructures
7. High-speed electron devices
8. Optical properties of quantum wells
9. Semiconductor laser diodes
10. Quantum effect devices
11. Fabrication technique of quantum dots
12. Quantum dot devices
13. Device application of quantum nano structures
14. Recent topics of semiconductor nanotechnology (1)
15. Recent topics of semiconductor nanotechnology (2)

Evaluation Criteria〉 Assignments count 100%

Textbook〉 None.

Reference〉 The Physics of Low-Dimensional Semiconductors, J.H. Davis, Springer

Contents〉 http://cms.db.tokushima-u.ac.jp/cgi-bin/toURL?EID=216818

Student〉 Any students can attend the class.

Contact〉

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