

Physics 801: *Nanostructures in Science and Technology*

Prof. Franz Himpsel

3 credits

Lecture meets Tuesday, Thursday 11:00-12:15, 1327 Sterling.

Occasionally there will be a lab in place of lecture in room 2365 Chemistry at times to be determined. See the [Chemistry 801 syllabus](#) for dates for these labs.

Course information

This special topics course will begin by considering what is special about nanostructures in terms of length and energy scales. From there, a variety of topics will be covered related to nanostructures. These include:

- Quantum wells, dots, and wires
- Single-electron devices
- Nanotubes and fullerenes
- Si/SiO₂ interfaces and the limits of silicon technology
- Magnetic nanostructures, giant magnetoresistance, and the limits of magnetic data storage
- Supramolecular chemistry, self-assembly, and molecular electronics

Recommended textbook (optional)

Gregory Timp. *Nanotechnology*. Springer, 1999.

Grading

Grading will be based on occasional homework problems, a short paper (3 pages), and a long paper with a oral presentation (5-10 pages). The papers will review the literature on a specific topic and will be prepared in a small group (2-3 students). For a possible web-based format see the student presentations at [RPI](#). There will be lab visits, guest lectures, and synthesis labs, as indicated in the outline.