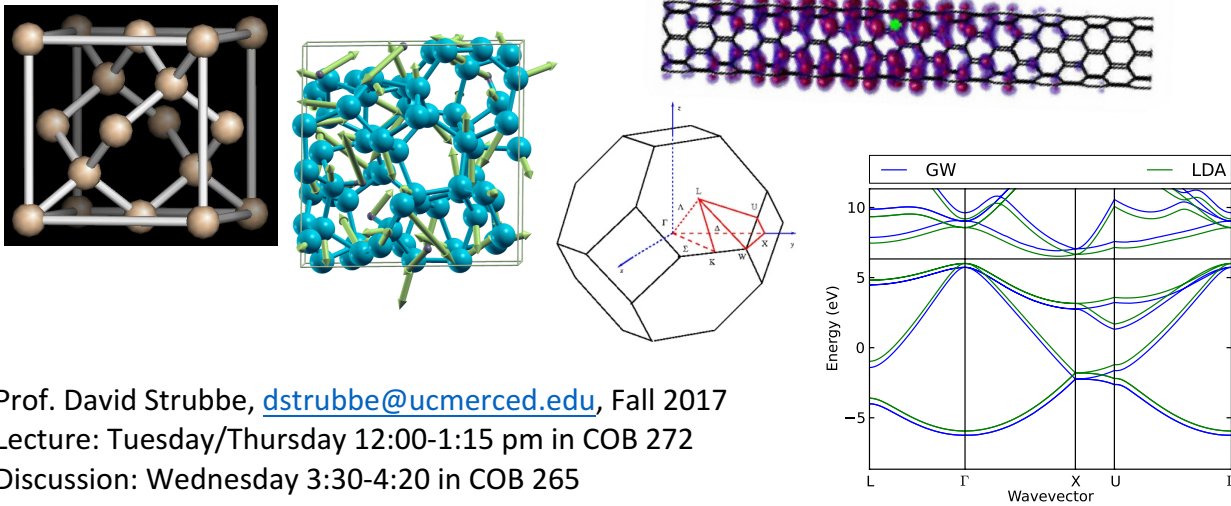


Physics 241: Graduate Solid-State Physics



Prof. David Strubbe, dstrubbe@ucmerced.edu, Fall 2017
Lecture: Tuesday/Thursday 12:00-1:15 pm in COB 272
Discussion: Wednesday 3:30-4:20 in COB 265

For the first time, this class will be offered as a stand-alone graduate class, not conjoined with undergraduate Physics 141. Students who have already taken the conjoined Physics 141/241 can register for Physics 298 with me to get credit for taking this course.

Pre-requisites: knowledge at the undergraduate level of solid-state physics, quantum mechanics, and statistical mechanics. Qualified students in chemistry, materials science, etc. also welcome. Students who have not taken undergraduate solid-state physics can review material beforehand (David Sidebottom, *Fundamentals of Condensed Matter and Crystalline Physics* or first half of Charles Kittel, *Introduction to Solid State Physics*) and attend Physics 141 concurrently in the fall.

Required Textbook: Marvin Cohen and Steven Louie, *Fundamentals of Condensed Matter Physics*, Cambridge University Press, 2016. ISBN 0521513316

Recommended/Optional Textbooks:

- Peter Yu and Manuel Cardona, *Fundamentals of Semiconductors: Physics and Materials Properties*, Springer, 4th ed. 2010. (older editions are good too)
- Neil W. Ashcroft and N. David Mermin, *Solid State Physics*, Brooks/Cole, 1976.

Topics (may be customized based on student interests):

- Elementary excitations/quasiparticles
- Bandstructure of electrons and phonons
- Optical and dielectric properties
- Symmetry and group theory for solids
- Simulation techniques for electronic structure with practical exercises
- Many-body physics in condensed matter
- Electronic and thermal transport: classical and quantum
- Final paper: literature review on relevant topic of interest