References for Applied Physics 219, Solid State Physics and the Energy Challenges

Contact:

Zhi-Xun Shen
The Paul Pigott Professor in Physical Sciences and Professor of Photon Science and, by courtesy, of Electrical Engineering

Mailing Address:
Geballe Laboratory for Advanced Materials
McCullough 342
Stanford University
Stanford, CA 94305-4045z
USA

Email: zxshen@stanford.edu
Phone: 650-725-8254
Fax: 650-725-5457
http://arpes.stanford.edu

Assistant: Ellie Lwin, 650-725-0440, elwin@stanford.edu

Course Assistant: Shibing Wang <shibingw@stanford.edu>

Overviews:

This is a graduate level survey course exploring the role of solid state physics in technologies that will help secure the energy future. Energy and environment are complex issues involving science, technology, culture, policy and treaties. Science is the foundation of all of these issues. Solid state physics is a very important branch of science that will play a major role in a number of emerging green technologies. This course will survey the physics principles behind a number of important future energy technologies.

- Overview of technology issues for a secure energy future
- Solar energy and solar cells
- Solid state lighting – LED, flurescence
- Superconductivity
- Solid state fuel cells and batteries
- Catalysis
- Electrical energy storage

- Thermo-electrical materials
- Thermonic emission – modern version
- PETE
- Spintronics
- Materials under extreme condition – hydrogen storage and nuclear plant materials
- Related topics – nano-materials

Directing Matter and Energy:

Five Challenges for Science and the Imagination

Report available at: http://www.sc.doe.gov/bes/reports/list.html

New Science for a Secure and Sustainable Energy Future

Report available at: http://www.sc.doe.gov/bes/reports/list.html

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PV

Basic Research needs for solar energy utilization

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Basic Research Need for Solid State Lighting

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Basic Research Needs for Electrical Energy Storage

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