Announcements

- MCAT physics session tonight 8-9 pm, in O'Leary 232.
- Toys 'n' Tea this afternoon from 4-5pm in Olin 251A. Fun and games with Oobleck!
- Hand-ins due after spring break on **Tuesday** at 4:30 pm.
- Our next exam is Thursday, March 20 (the week we are back from break). You will be allowed to bring a new 3"$\times$5" index card with you.

Physics & Astronomy Seminar

Conservation of Energy, Time Reversal, and Fireflies

Deepak Iyer

Bucknell University

Olin 268. Thursday, Mar. 6 at 12:00 pm

Pizza provided. Bring your own water bottle.

Applications of Quantum Mechanics (partial list)

- Chemistry: binding energies, orbitals.
- Modern electronics: computers (semiconductor transistors), cameras (electro-optical circuits), fiber optics communications, etc.
- Electron microscopy
- Spectroscopy (identifying molecular compositions). Used extensively in biology, chemistry, geology, astronomy.
- Medicine: radioactivity and radiation damage, MRI imaging, PET scans, CAT scans, etc.
- Radioactive dating in geology
- Modern technology: e.g., lasers, superconductors
- Future technological breakthroughs. E.g., quantum computers or nanoscale "robots" that could destroy tumors.

Lecture 13 — Concept Test 1

I have a green laser with wavelength $532\,\text{nm}$ and a red laser with wavelength $633\,\text{nm}$. Both lasers emit the same power ($3\,\text{mW}$) of light. Which laser emits a greater number of photons per unit time?

1. the green laser
2. the red laser
3. both emit the same number
4. not enough information

Lecture 13 — Concept Test 2

For a particular cavity, there are 4400 photons in the $j = 1$ mode. How many photons are in the $j = 100$ mode?

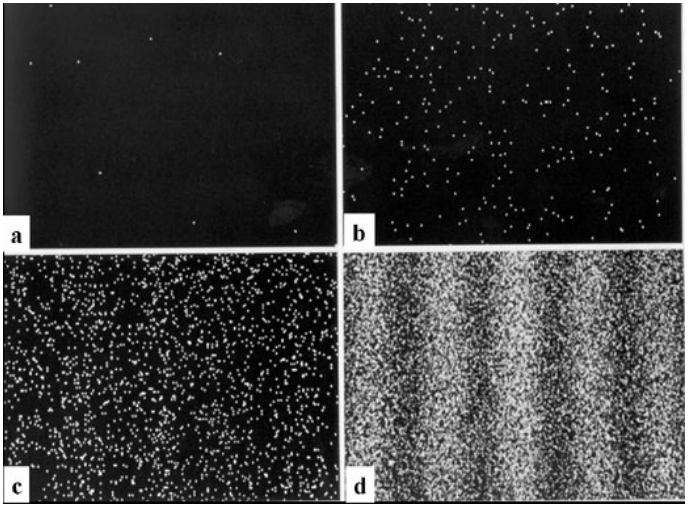
1. 1
2. 100
3. $440\,000$
4. 4400
5. 4300
6. 44

Lecture 13 — Concept Test 3

Photons with energy $3\,\text{eV}$ hit a metal surface with a binding energy of $5\,\text{eV}$. What is the maximum energy of electrons ejected from the surface by this process?

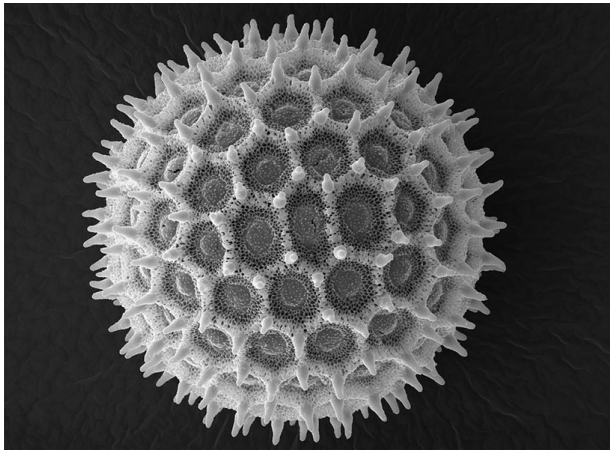
1. 2 eV
2. 3 eV
3. 5 eV
4. 8 eV
5. 15 eV
6. There aren't any electrons ejected.

Electron Double Slit Experiment



https://www.hitachi.com/rd/research/materials/quantum/doubleslit/index.html

Electron Microscope Image (Morning Glory Pollen)



https://www.dartmouth.edu/emlab/gallery/index.php