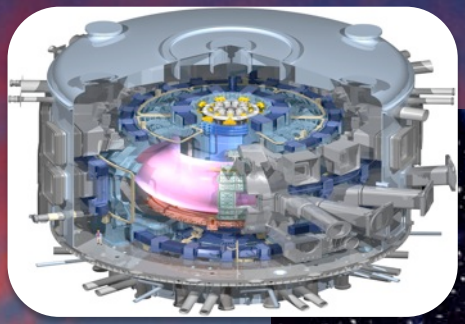
Why Major in PHYSICS at USD?

What is Physics?

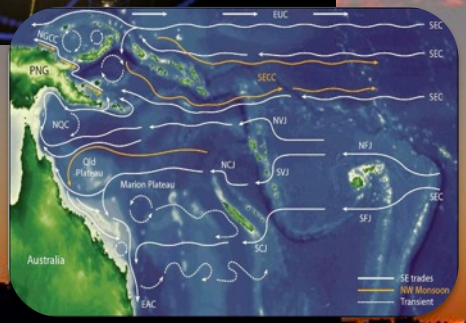
What is Physics?

Modern Technology



Alternative Energy Sources

Intelligence & the Brain

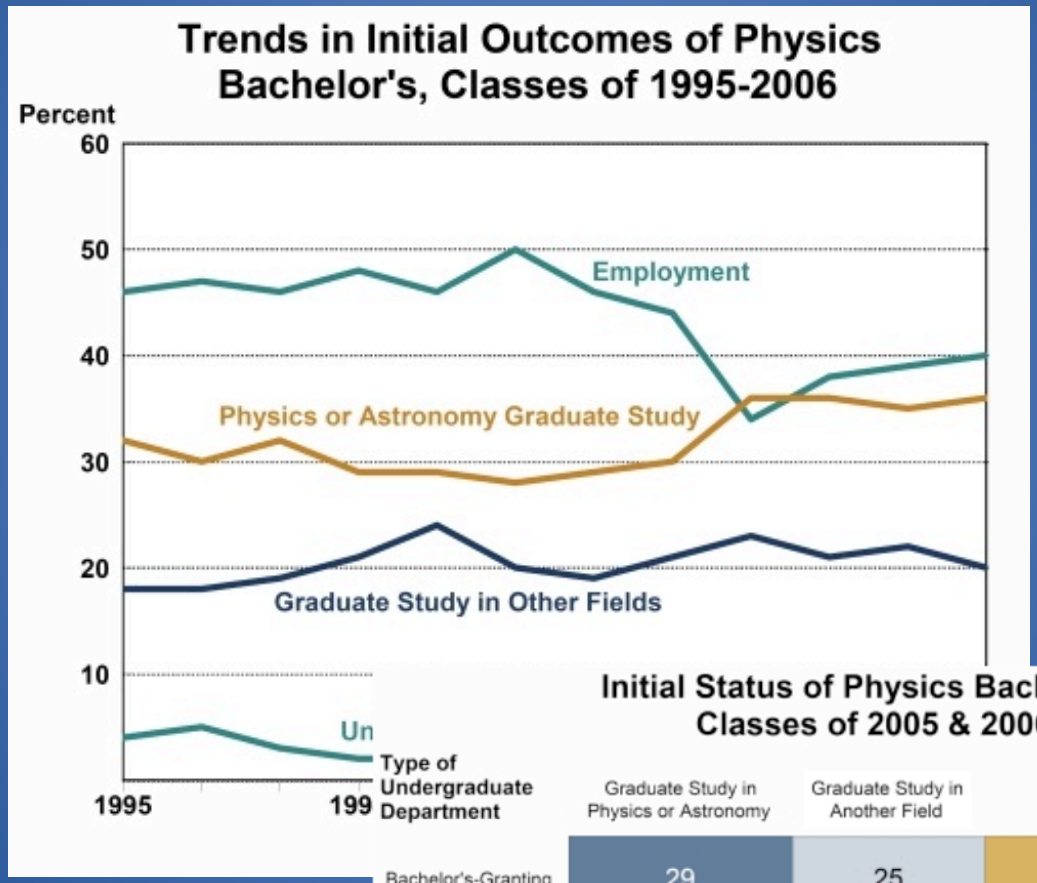


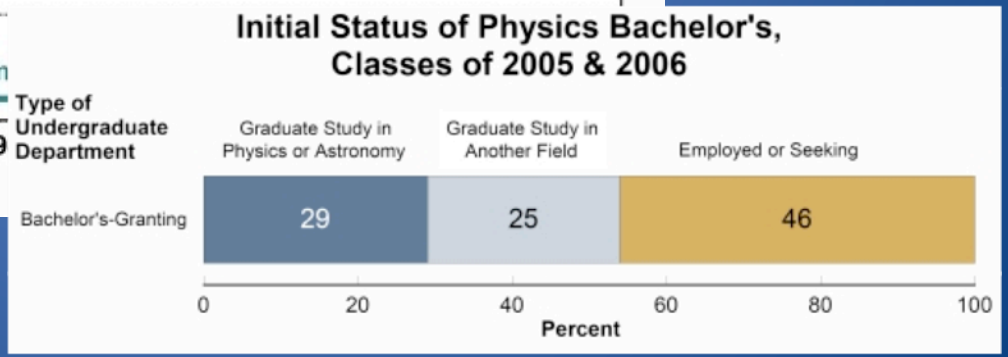
Oceanography

Economics & Finance

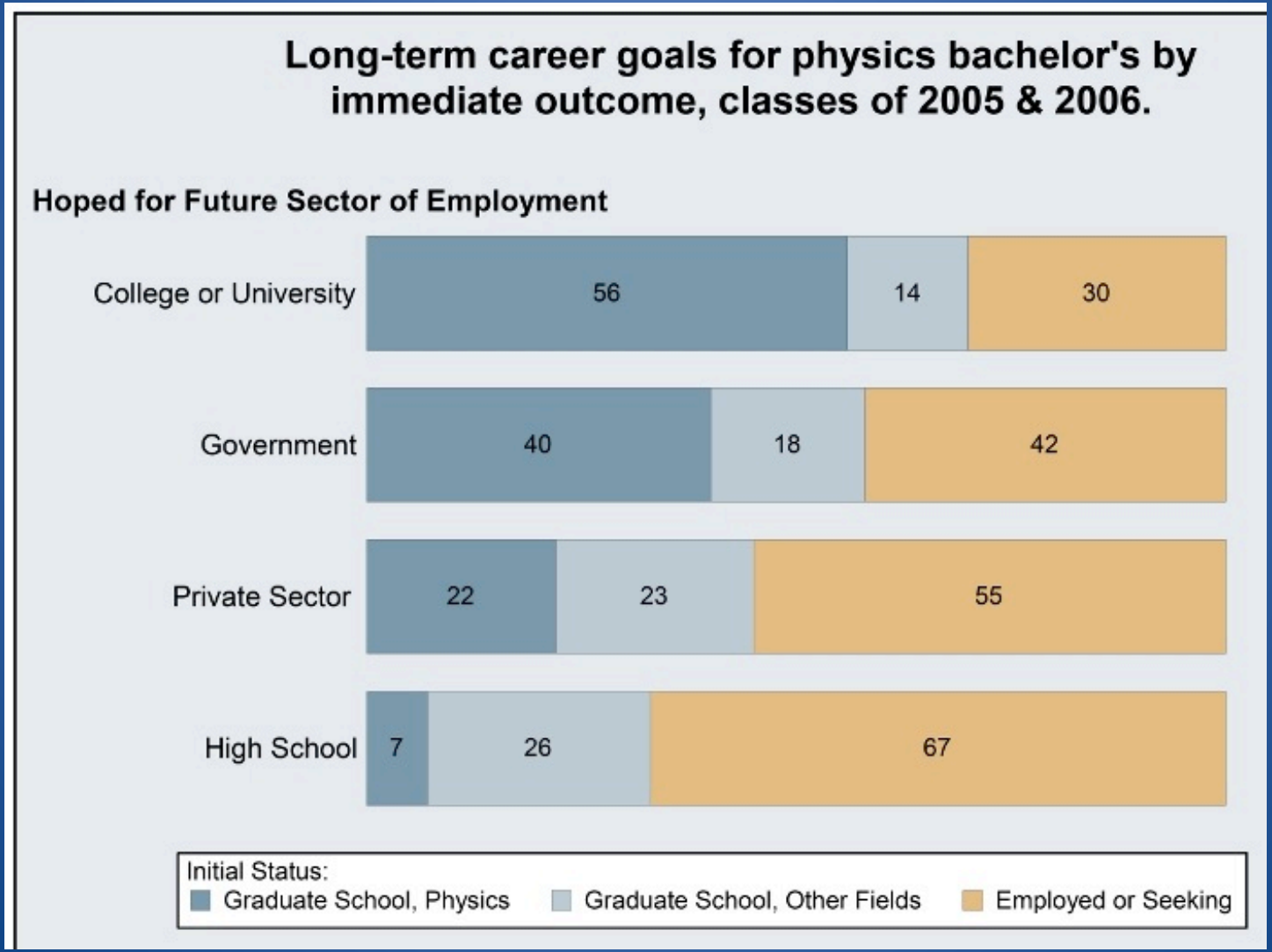
Engineering

What can you do with a physics degree?

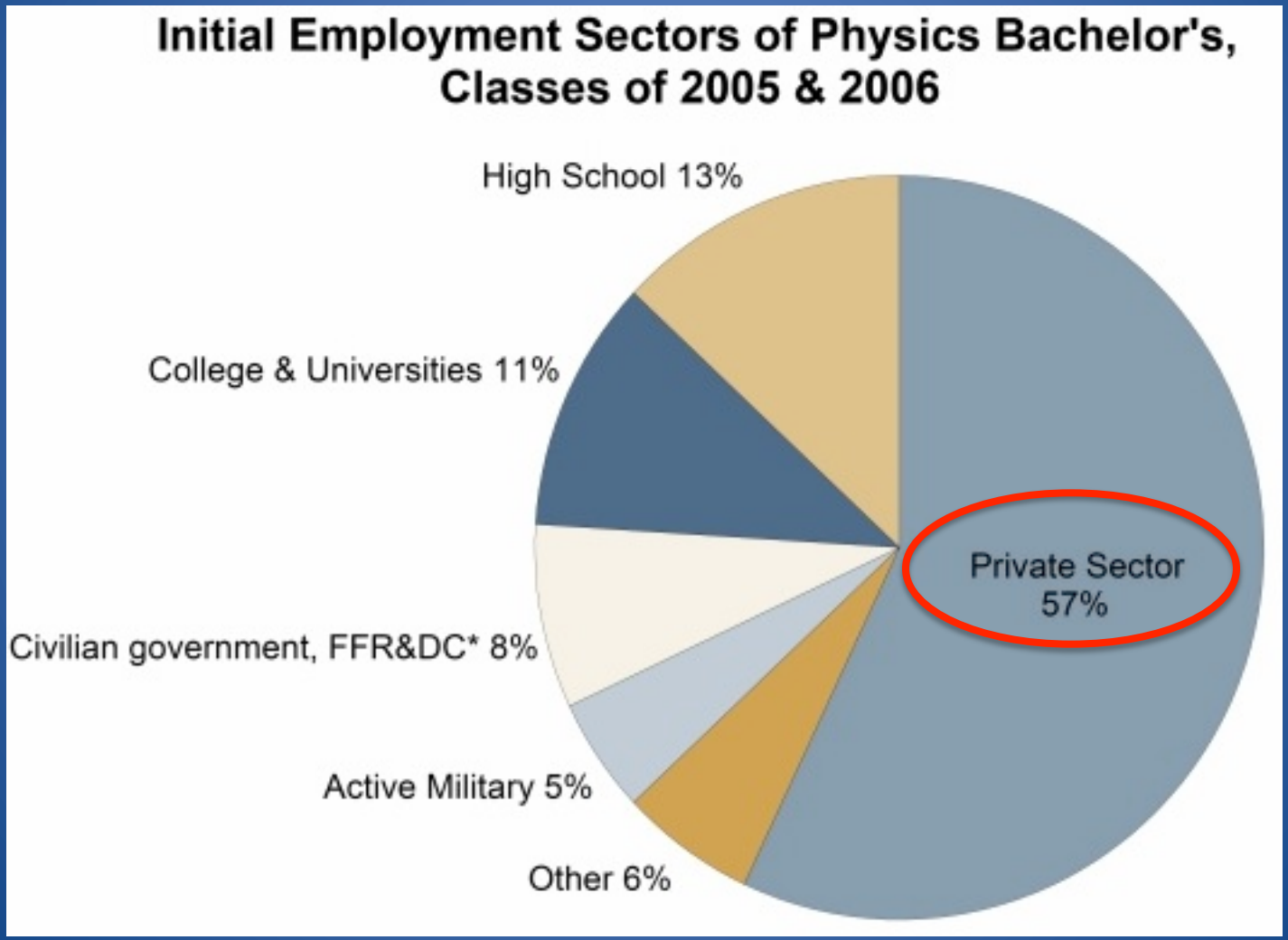




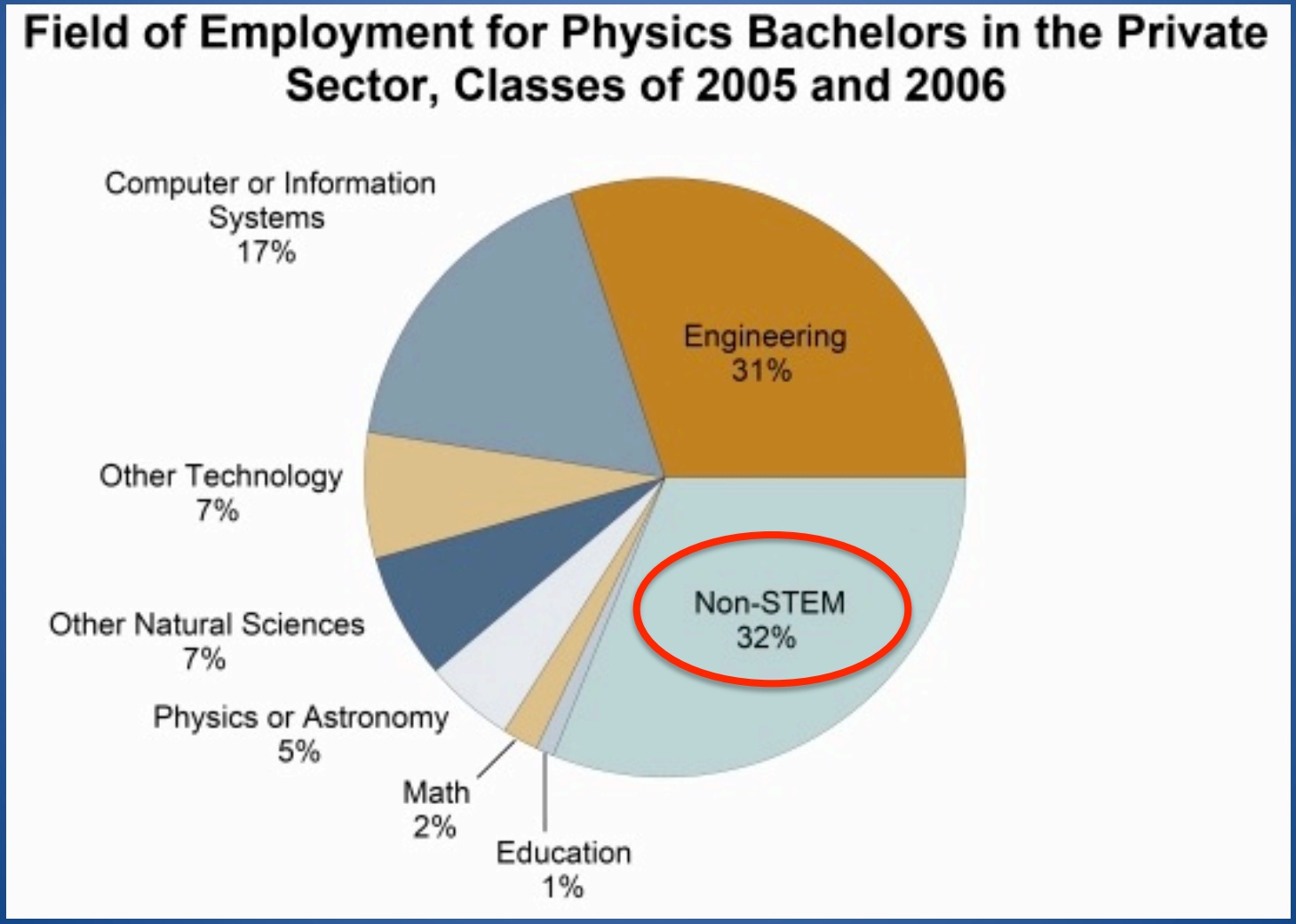
What can you do with a physics degree?



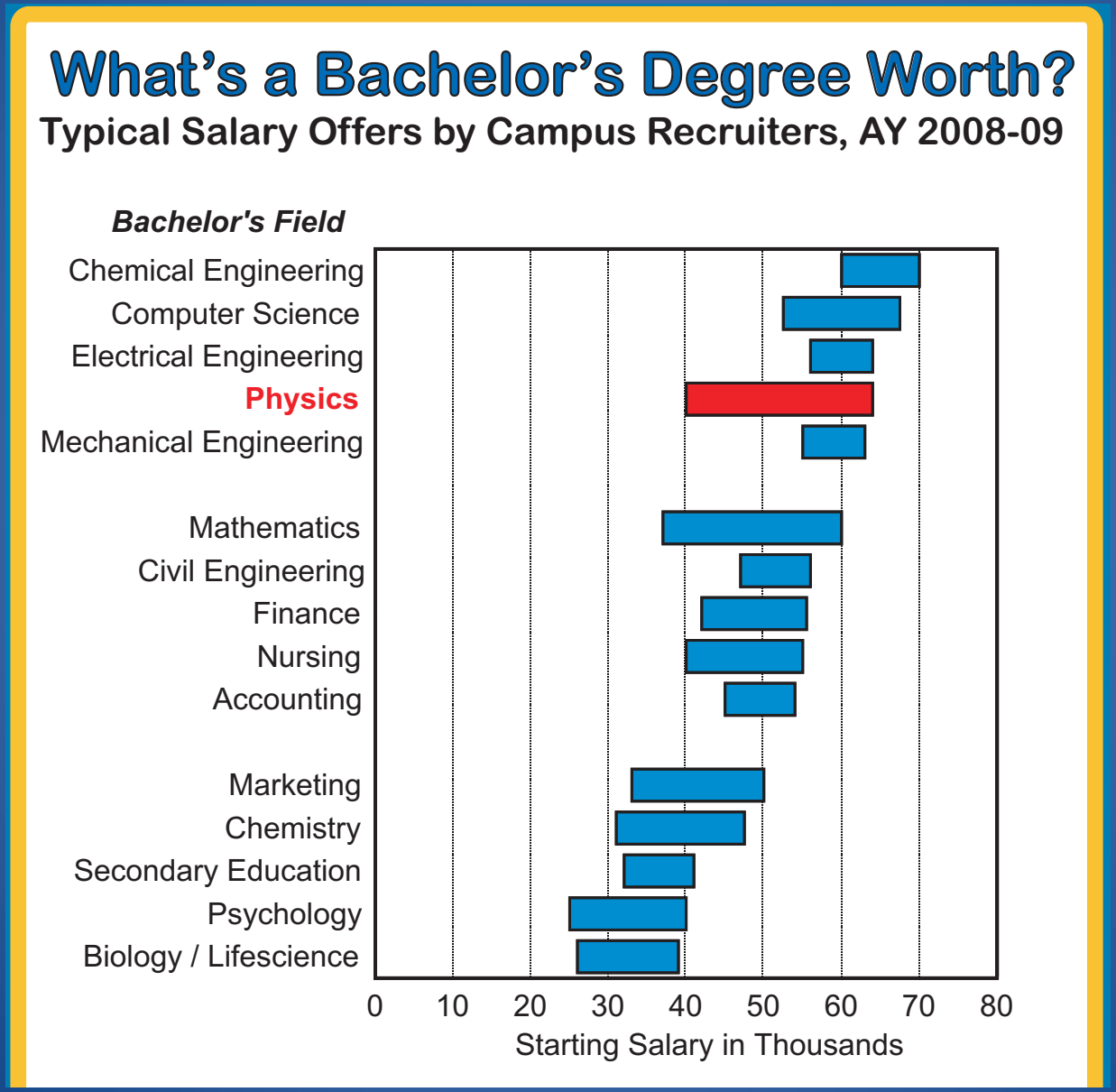
What can you do with a physics degree?



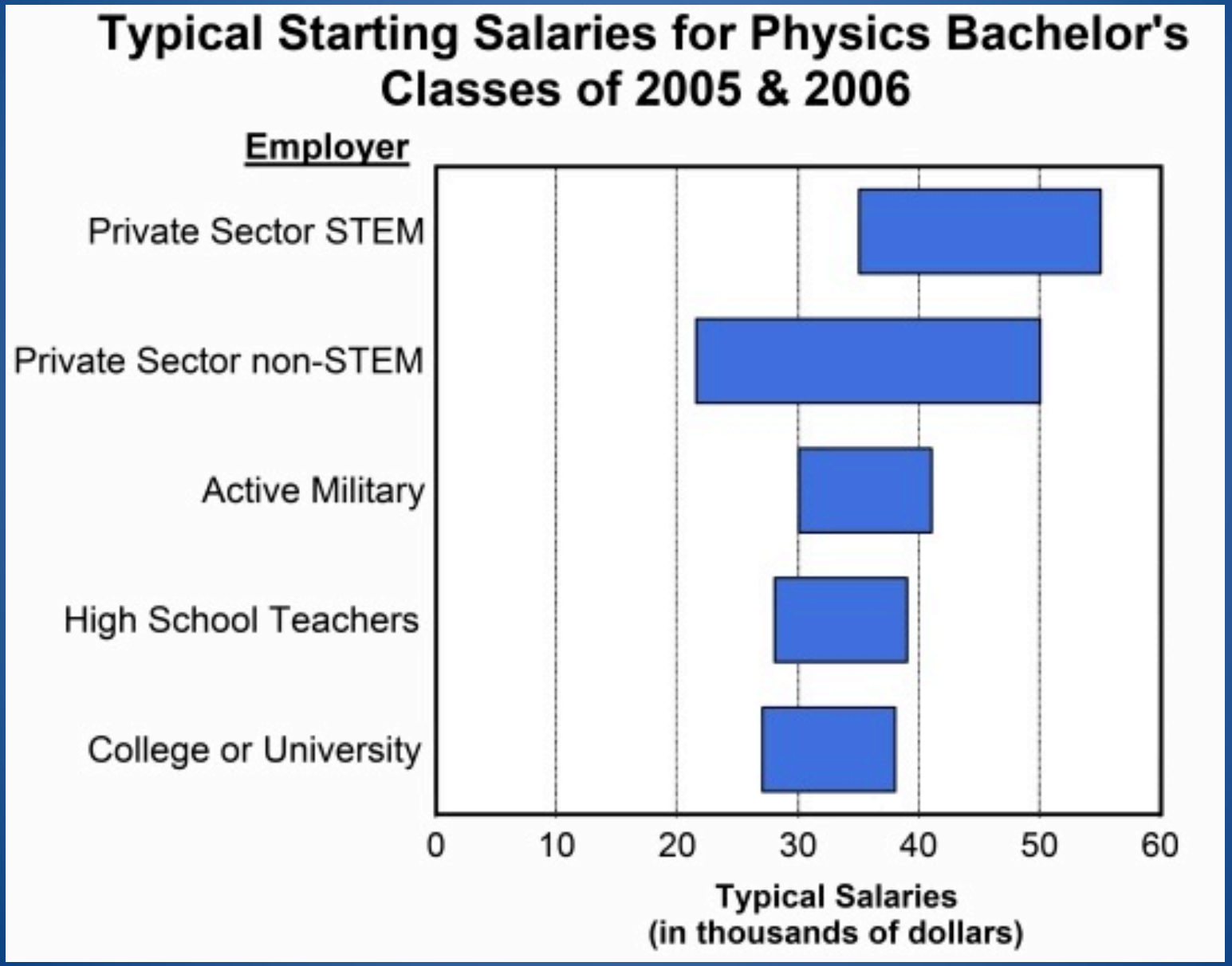
What can you do with a physics degree?



How much $$ can you make?



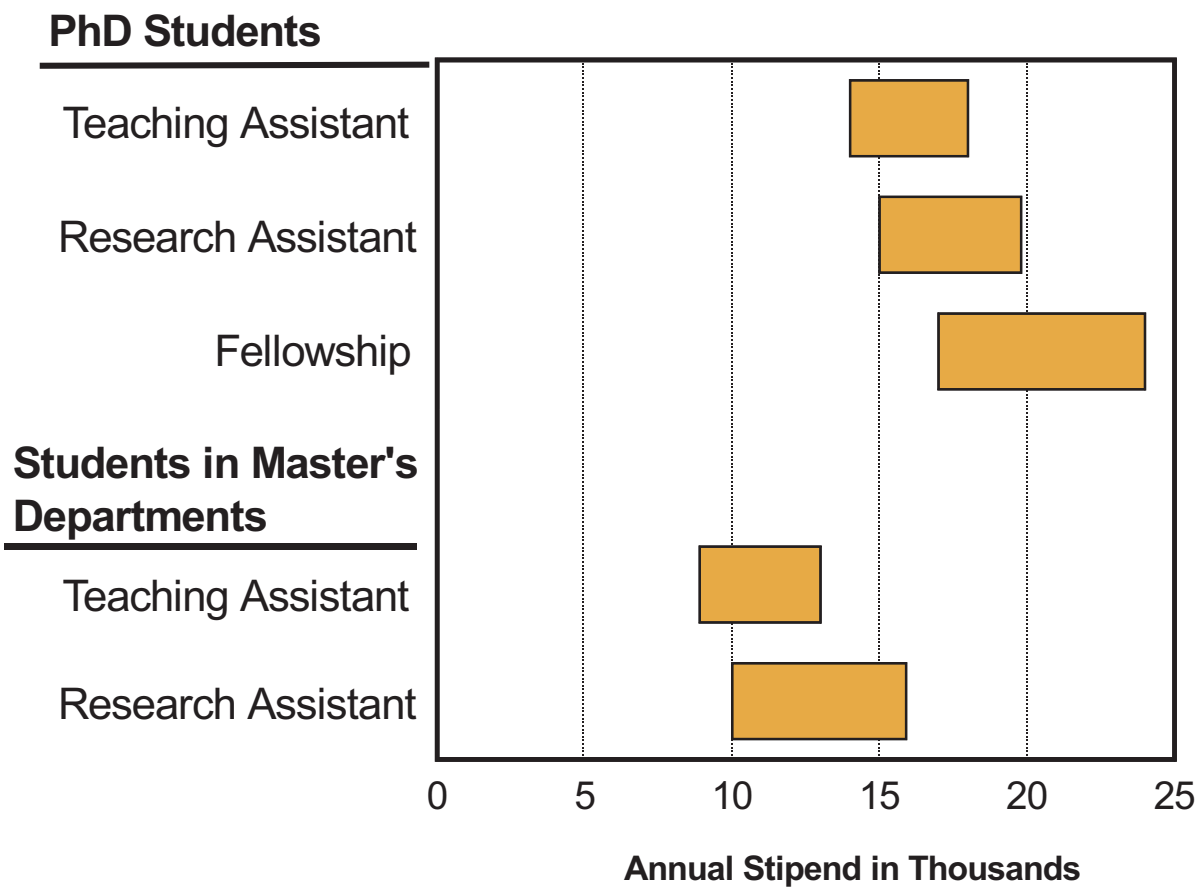
How much $$ can you make?



You can get paid to go to school!!

Typical Stipends

Full-time Physics Graduate Students



Thinking about med or law school?

Average MCAT Scores by Selected Majors, 2009.

	Physical Sciences	Biological Sciences	Verbal reasoning	Number of applicants
Biomedical Engineering	10.9	10.7	9.6	1,005
Physics	11.1	10.3	9.6	207
Electrical Engineering	10.9	10.5	9.4	195
Economics	10.4	10.5	9.7	566
Neuroscience	9.9	10.6	9.5	1,066
Mathematics	10.3	10.1	9.6	374
English	9.4	9.9	10.3	434
Biochemistry	9.9	10.3	9.1	2,594
Chemistry	9.8	9.9	9.0	2,091
Microbiology (or Bacteriology)	9.0	9.9	8.7	775
Psychology	8.8	9.4	9.1	2,421
Biology	8.7	9.5	8.7	12,705
Premedical	8.3	9.0	8.4	663
All Majors	9.2	9.8	9.0	41,487

Average LSAT Scores* by Selected Majors, 2009.

	Mean score	Number of applicants
Physics	161.5	180
Mathematics	159.7	336
Economics	157.4	3,047
Electrical Engineering	156.3	546
Mechanical Engineering	156.0	427
Chemistry	155.7	355
English	154.7	5,120
Biology	154.5	1,055
Computer Science	154.0	682
Political Science	153.0	14,964
Psychology	152.5	4,355
Pre Law	148.3	1,078
Criminal Justice	145.5	3,306
All Majors	152.6	81,530

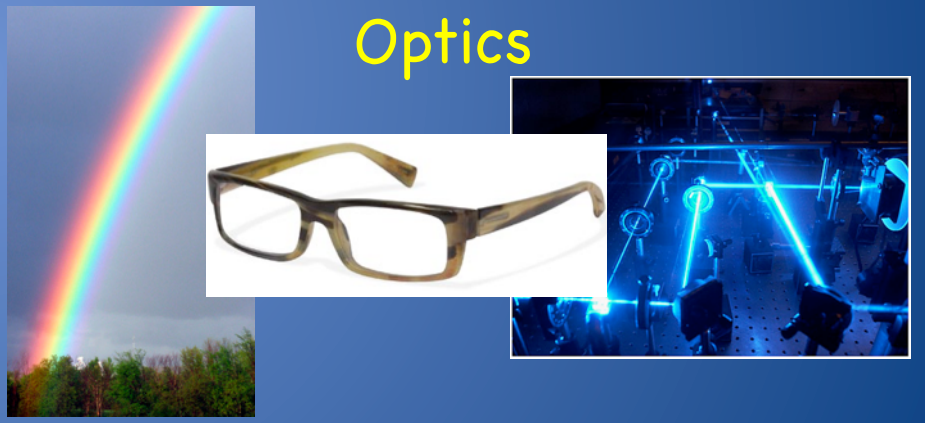
What do you learn in physics?

Classical Mechanics

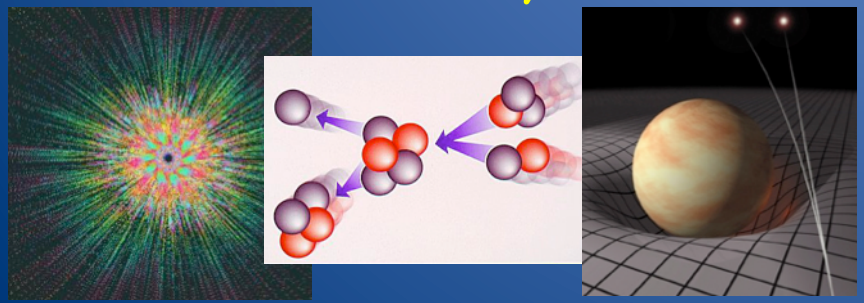
Thermal & statistical dynamics

Electromagnetism

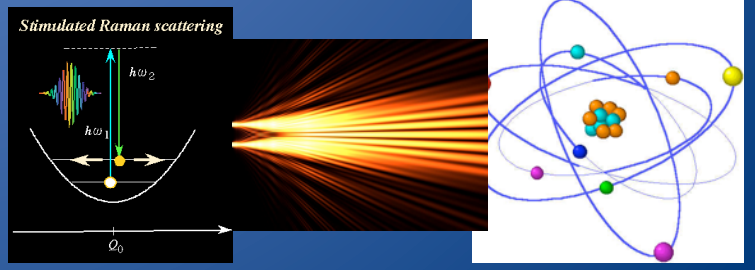
Optics



Relativity

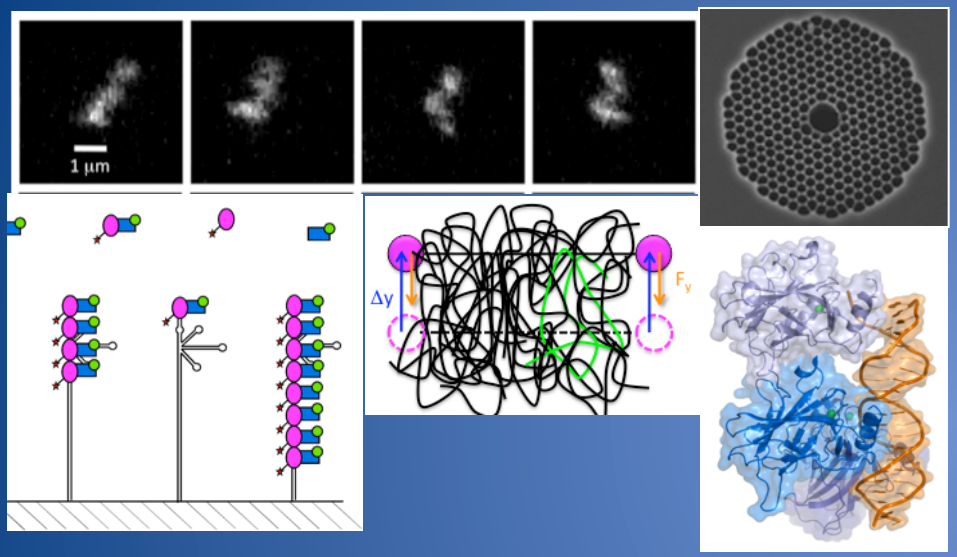


Quantum Mechanics

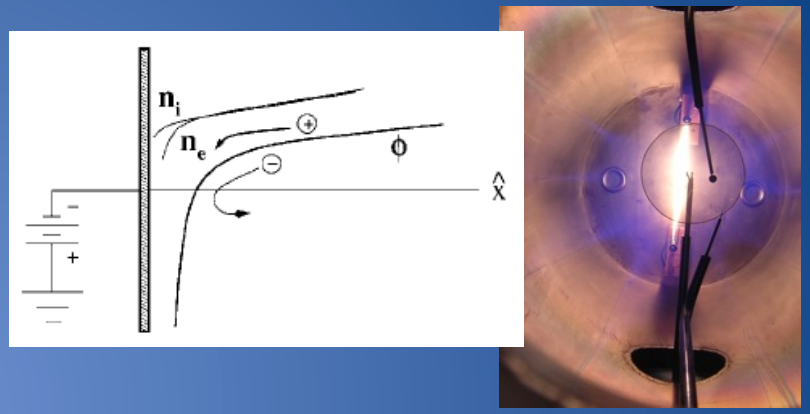


What do physicists do??

Biophysics & Chemical Physics

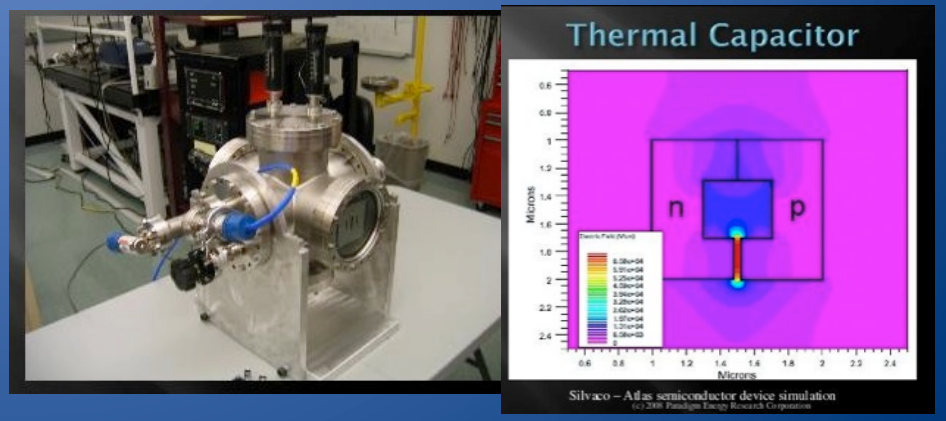


Plasma Physics

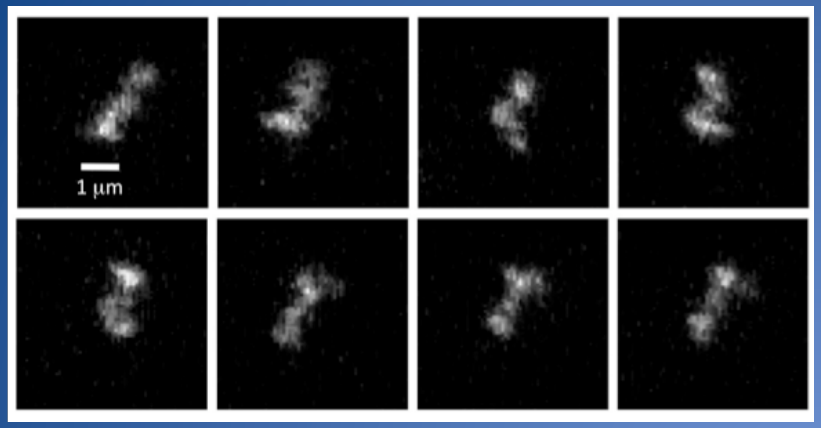


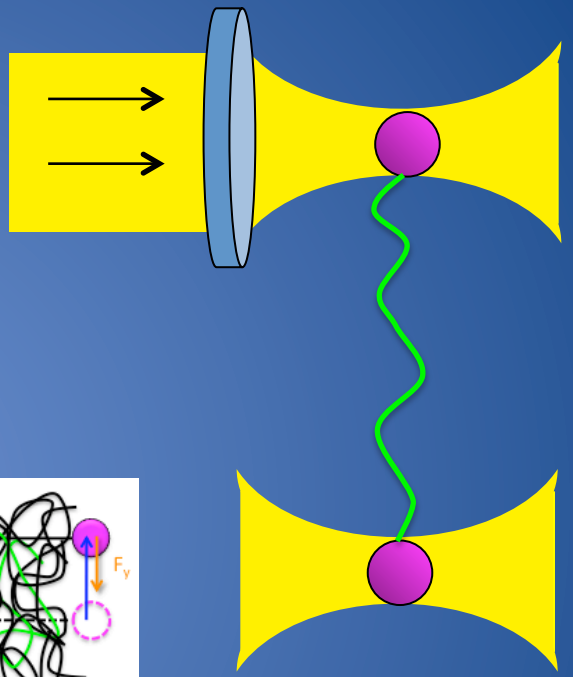
Astrophysics

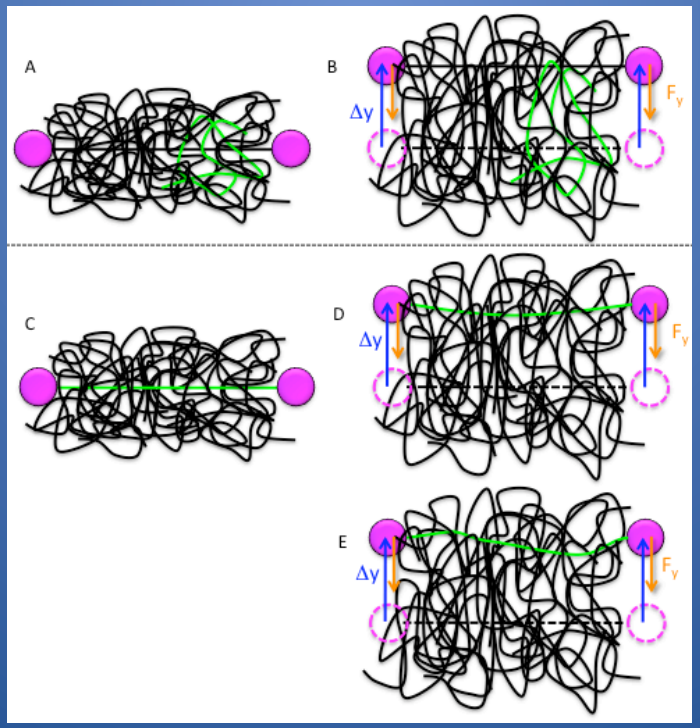
Thermodynamics & Nanotechnology

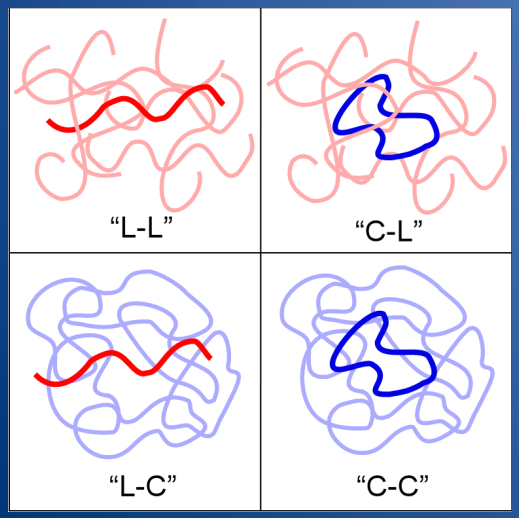


Dr. Anderson – Polymer & Biological Physics



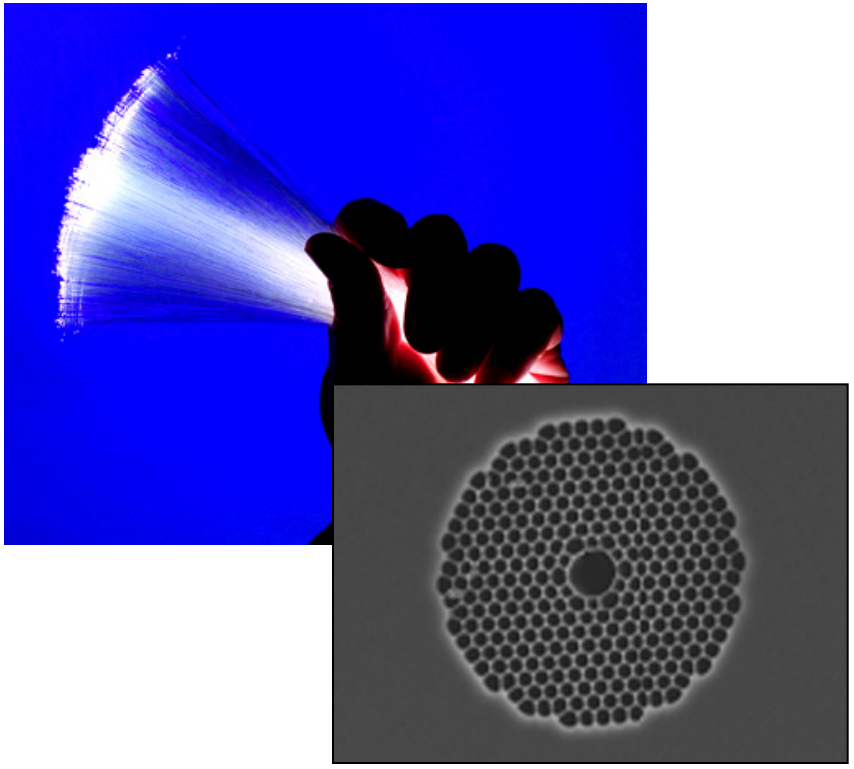




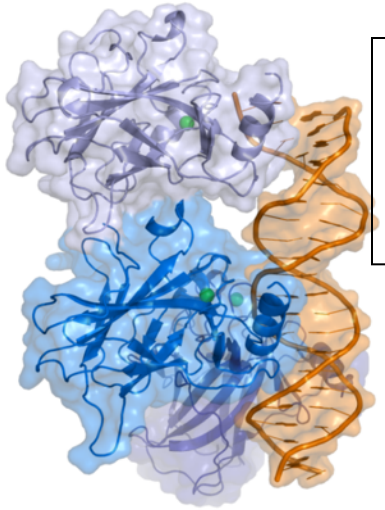


Dr. Page – Biological Physics

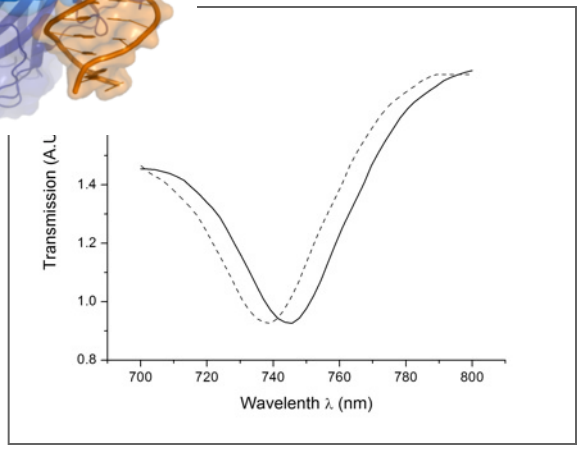
- Protein Infused Photonic Crystal Fibers (PCFs)



Electron micrograph of the center section of the fibers. Each small hole is ~1 micron in diameter



Structure of protein p53, a tumor suppressor protein that we currently work with in lab.



Spectra shift due to protein conformation change.

A note on the plasma sheath and the Bohm criterion

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Department of Physics, University of San Diego, San Diego, California 92110

(Received 1 January 2006; accepted 29 September 2006)

The Bohm criterion is an inequality signifying that the ion flow speed at the plasma boundary must be at least as great as the ion sound speed in order for a sheath to form at the boundary. A physical explanation for this phenomenon is given, and the phenomenon is compared with the flow of falling water.
[DOI: 10.1119/1.2372469]

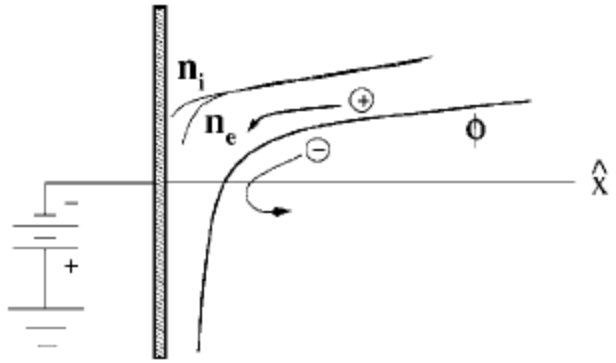


Fig. 1. Schematic of the plasma bounded by a negatively biased boundary wall. Ions flow to the wall down the potential hill $\phi(x)$, while electrons are repelled. Net space charge appears at the sheath edge, where the gradients in the ion density and electron density diverge.

The plasma state of matter exhibits many curious `medium-like' behaviors, one of which is electrical shielding. The plasma shields out external potential and maintains its neutrality in a curious way---by shooting ions at the boundary so fast that they break the sound barrier (the Bohm Criterion)! Unless the ions reach this speed, shielding fails. I study this effect experimentally, using laser induced fluorescence

Laser induced Fluorescence with diode lasers permits measuring ion speeds in plasmas

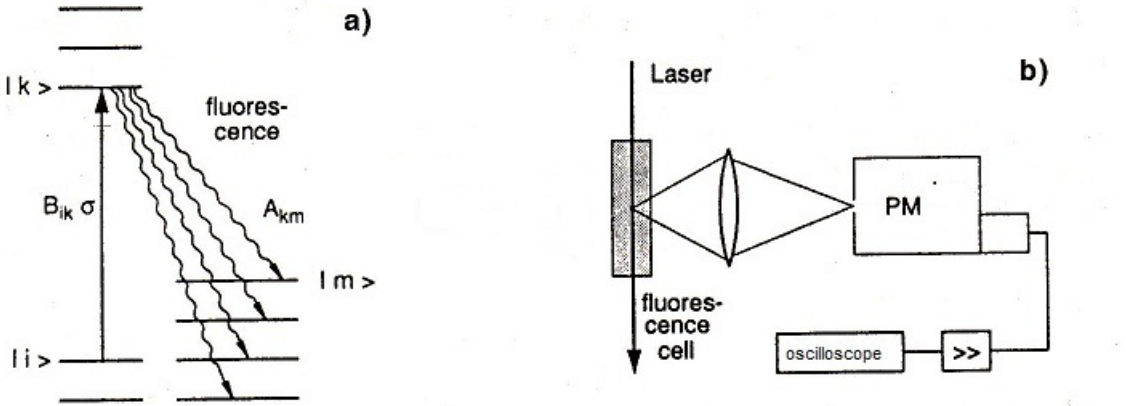
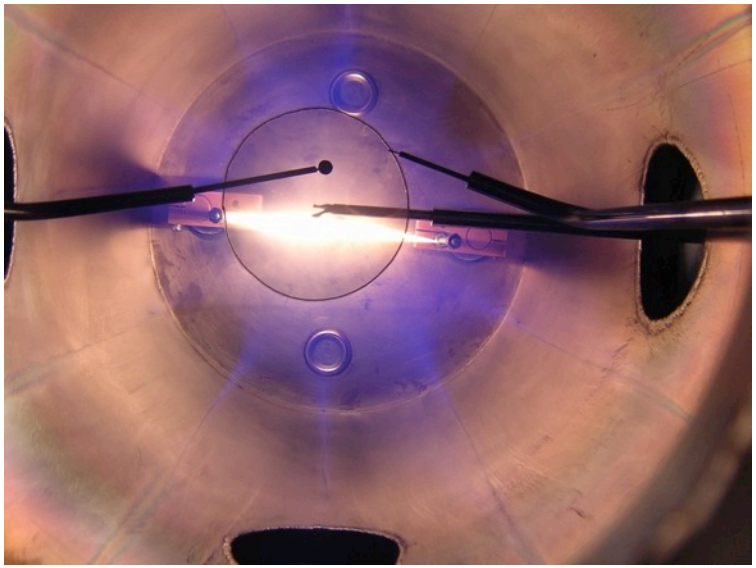
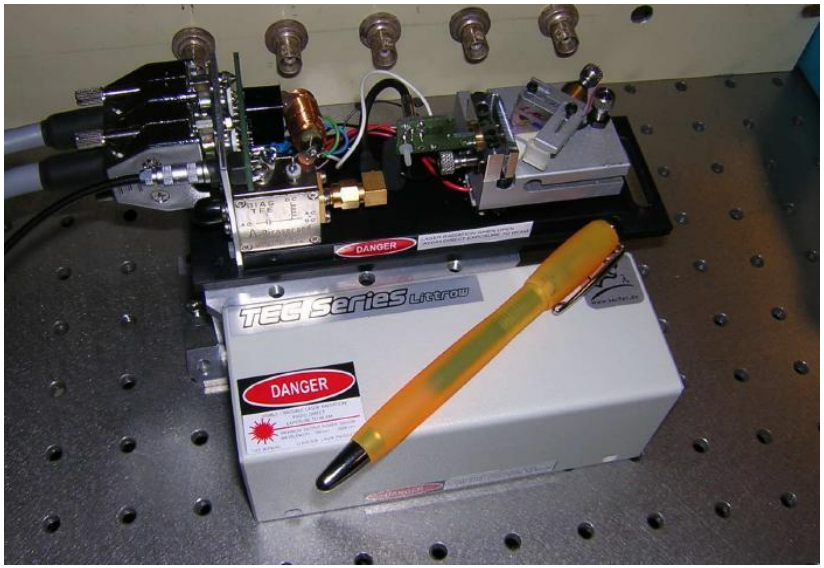


Fig.6.33a,b. Laser-induced fluorescence: **(a)** Level scheme and **(b)** experimental arrangement for measuring LIF spectra





Dr. Devine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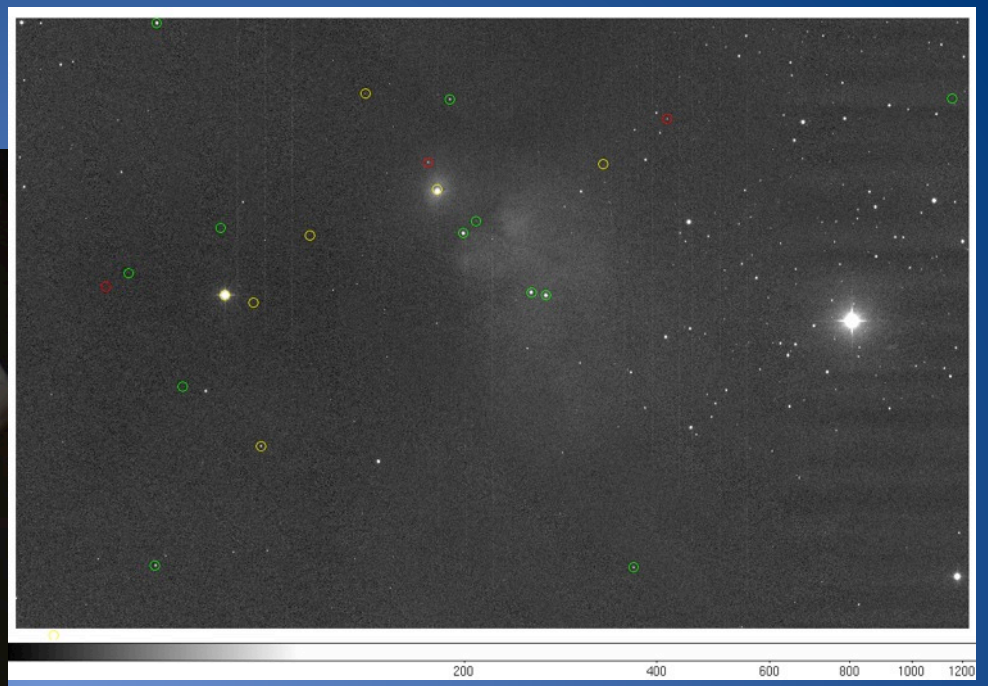
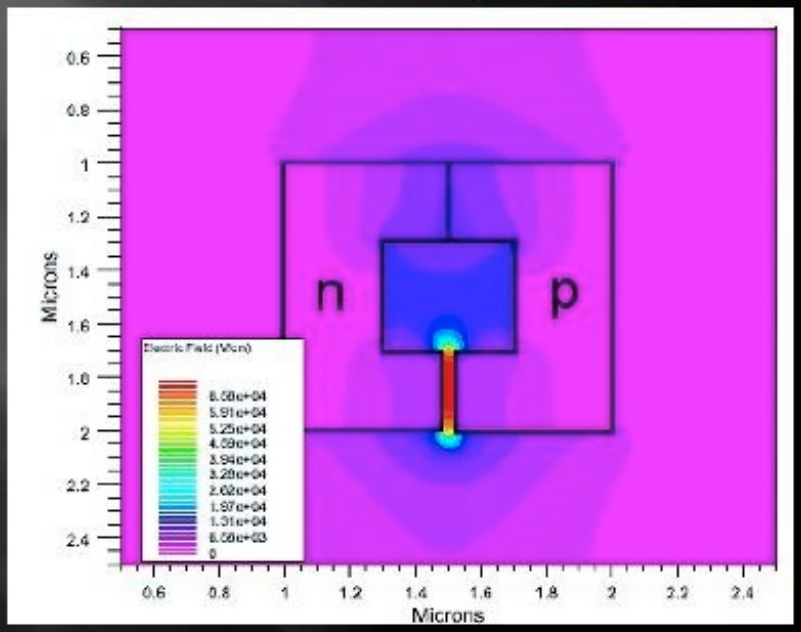

200
400
600
800
1000
1200

Dr. Sheehan

Detection Apparatus Behind

Thermal Capacitor

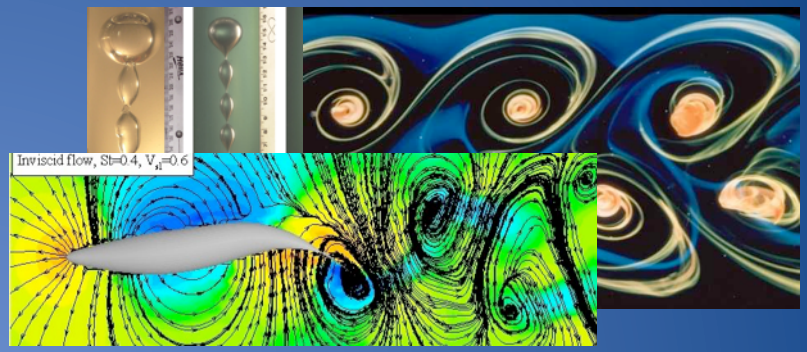


Silvaco – Atlas semiconductor device simulation

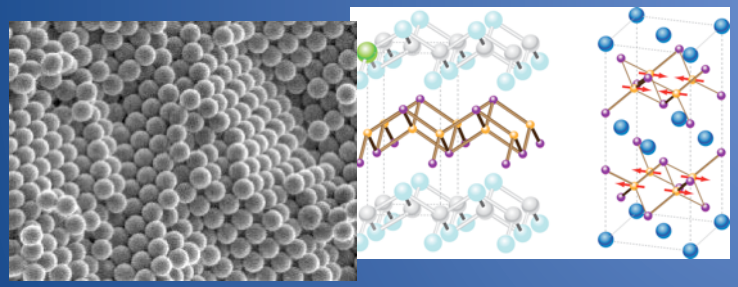
What do physicists do??

High Energy Physics

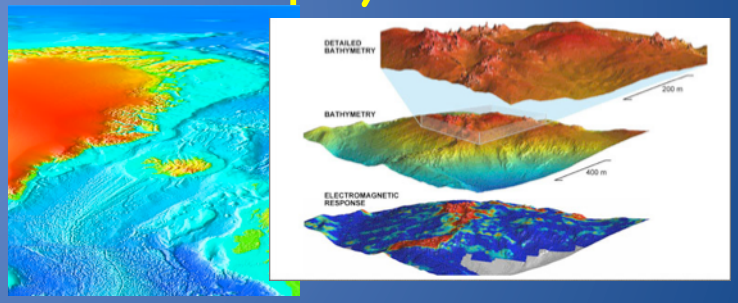
Fluid Mechanics



Condensed Matter



Geophysics



Atomic, Molecular & Optical Physics