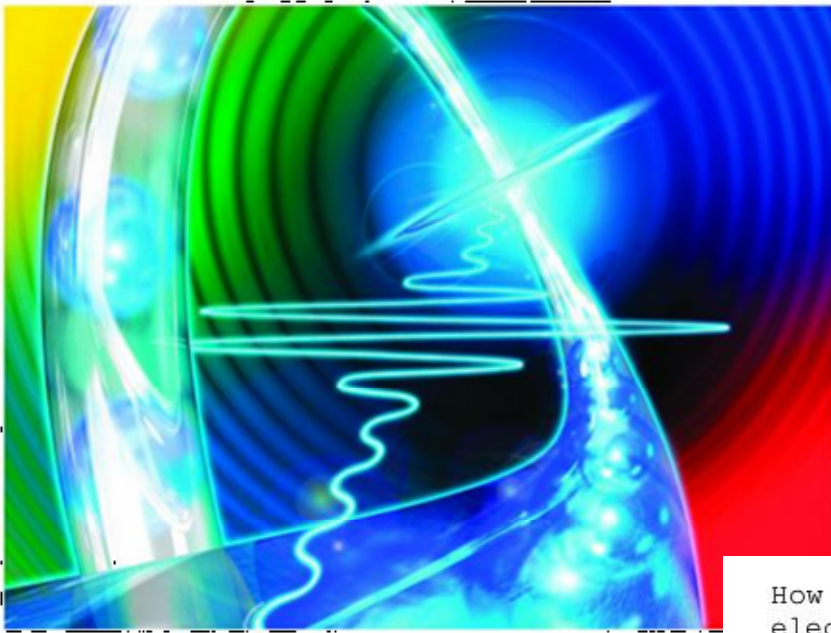


Physics 1B: Electricity and Magnetism

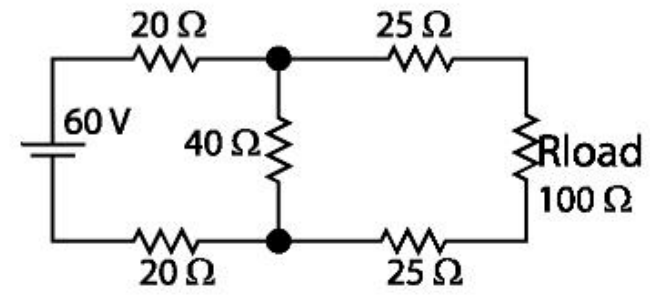
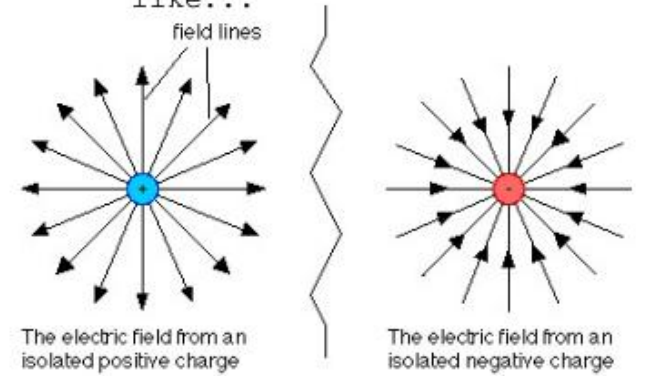
Announcements



How I thought doing
electricity in Physics
would be like...



How doing electricity in
Physics is actually
like...



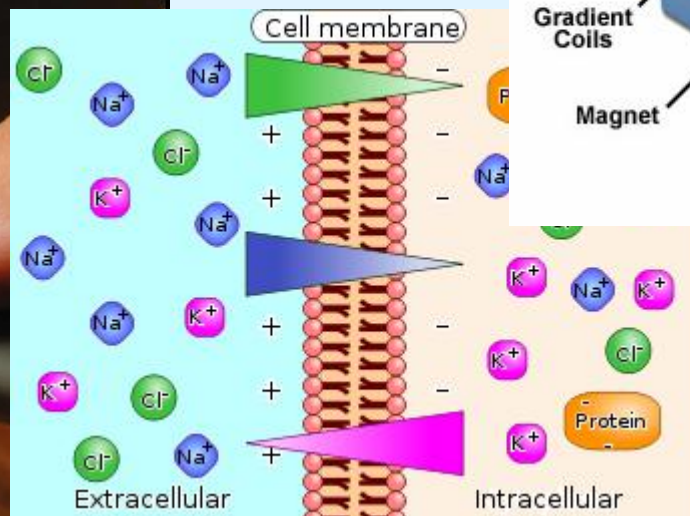
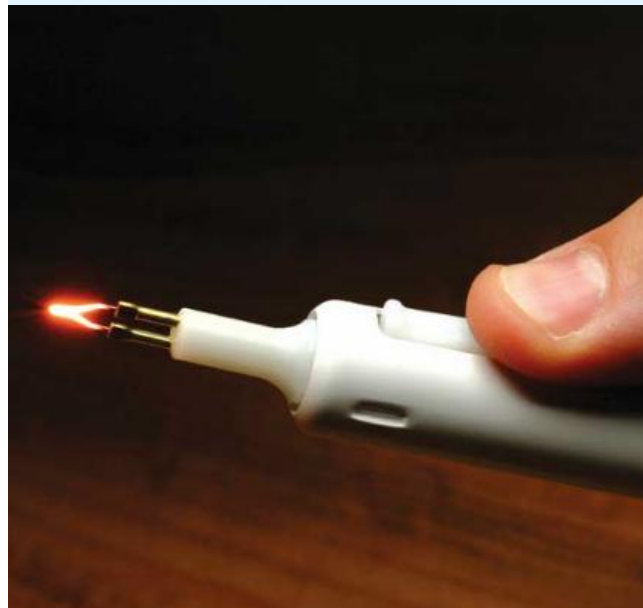
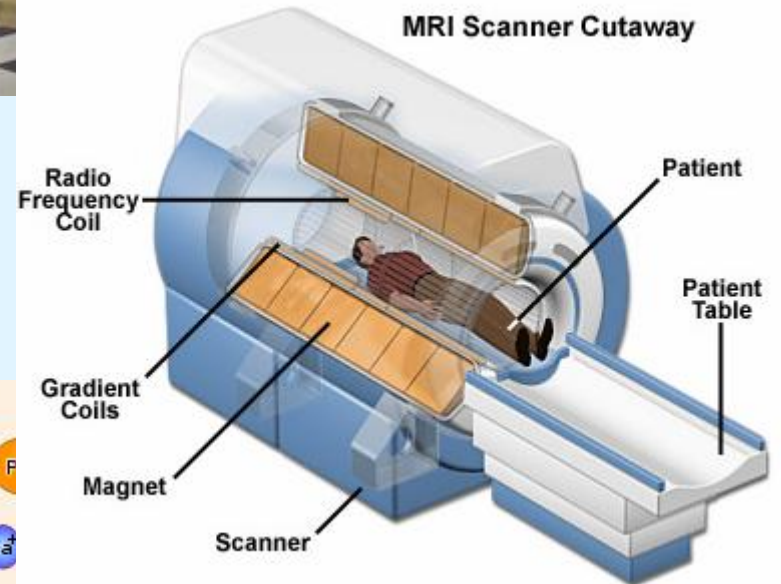
Eric L. Michelsen
emichels
at physics etc.

6/5/2012

What it will also be like



MRI Scanner Cutaway



Who am I?

- Eric Michelsen
 - An electrical engineer for a few decades
 - BSEE
 - PhD Physics UCSD, June 2010
 - Research: Lunar Laser Ranging
 - Study of gravity, aka General Relativity
 - My book on quantum mechanics due out next year from Springer
 - Interests:
 - Human Rights
 - Medical physics
 - Quantum Field Theory
 - Scuba diving



Who Are You?

- What majors?
- What years?

Here Is Your Teaching Assistant (TA)

- Pengfei Chen (pec008 at physics... etc.)
- He will handle
 - Grading
 - Weekly problem session

I Can't Teach You Anything

- I guess they picked the wrong guy for this job
- You must learn
 - I can help you
- What is the best way to get a good grade?
 - Learn the material
 - Work together, help each other

Smart People Ask Questions

- *We never* look down at someone asking a question
- Smart people ask questions
 - That's how they got that way
- My job is to provide a safe environment conducive to learning and questions
 - I take that very seriously

Course Administration

- You must check the web page every day for updates
 - Schedules, contact info, etc. are there
- I will post the class slides there
 - With updates and corrections
 - Podcasts are online: audio and video
- No cell phones in class
- I will allow computers for now
 - But only for class-related work
 - Be fair to your fellow students
- You must check your official UCSD email regularly
 - I am required to use it for any private matters, e.g. grades

Grading

- Classroom response TBD, \approx 5 - 10%
- Quizzes (best 4 of 5) TBD, \approx 60-70%
- Final Exam TBD, \approx 20-35%
- The following grades are a minimum:
 - 85% A
 - 75% B
 - 65% C
 - 55% D
 - <55% F
- Plusses and minuses at instructor discretion.
- Actual grades *may* be higher if warranted by overall class performance ...
 - *But don't count on it.*
 - **Curves in my last two similar classes were small**

Dropping a Quiz Is Not to Improve Your Grade

- The purpose of dropping one quiz is to accommodate one unavoidable conflict for medical, academic, athletic, or other reasons.
 - The purpose is *not* to improve your grade
- If you have to miss a quiz, that's the one you drop
 - Consider yourself normal
 - If you can take all 5 quizzes, consider yourself lucky
- If you have to miss 2 quizzes, you will likely need to drop the class
- No early exams, no late exams, no makeup exams

Academic Integrity

- Every honest student benefits from maintaining high academic integrity.
- Please read “UCSD Policy on Integrity of Scholarship” in the UCSD General Catalog,
<http://www.ucsd.edu/catalog/front/AcadRegu.html>
 - These rules will be rigorously enforced
- Any confirmed case of cheating will result in an “F” grade in this course, and referral to the dean for disciplinary action.
- Cheating includes
 - Submitting another person’s work as your own
 - Copying from another student on homework, quizzes, or exams
 - Knowingly allowing another student to copy from you
 - Use of unauthorized materials during a quiz or exam
 - Misusing iClickers
 - Attempts to manipulate grades unfairly; and intentionally misusing code numbers.
 - Any attempt to obtain a higher grade by means other than honest effort.

Set subfrequency code $1/2 = A/A$
(the default).

Have you used iClickers before?

- A Yes, and I have mine with me.
- B Yes, but I don't have mine with me now. I promise to bring it every day from now on.
- C I don't know what iClickers are.
- D I don't know how to spell iClicker.
- E I don't know what class I'm in.

Do you know how to register your iClicker online?

A Yes, and I will do it tonight:

<http://iclicker.com/registration/>

- I will use my 9-character Student ID to register
- I will use full 8-digit clicker ID, including leading zeros

B Yes, but I don't have mine with me now

- I promise to bring it every day from now on.

C I don't know what iClickers are

D I don't know how to spell iClicker

E I don't know what class I'm in

What about 1BL?

- A I have completed 1BL
- B I'm in 1BL now
- C I plan to take 1BL
- D I don't know what 1BL is
- E I am not planning to take 1BL

Announcements Monday, 4/2/2012

- HW will be posted soon
- Problem Session available every week
 - Thursdays, 7-9pm, Center Hall 216
- Tutorial Center
- Quiz every Friday of even weeks (2, 4, 6, 8, 10)
- Podcasts available (video and audio)

Announcements Wednesday 4/4/2012

- Start of Chapter 19 HW posted
- Out of town yesterday, catching up on email
 - Everyone must read their official UCSD email
- Podcasts available (video and audio)
- Cool order-of-magnitude web site
 - Get a feel for the size of the everything:
 - http://primaxstudio.com/stuff/scale_of_universe/
 - Thanks to a Winter-2011 student

Announcements

Friday 4/6/2012

- iClicker credit starts today
 - Please register iClickers online
 - If you haven't registered, your responses *will* count when you do
- Office hours posted: Wed 12:30-2:30, SERF-317
- Class discussion provides a conceptual understanding for numerical calculations
 - HW is essential for numerical practice
 - Class discussion **alone** is *insufficient* for passing the exams.
- Anyone go to Problem Session?
- If you have a specific wish for this class (e.g. I need to pass, I want an A), tell me now (come to office hours)
 - not in the 9th week, when it's too late
 - No extra credit beyond what is available to everyone
- Physics Department Tutorial Center
 - Sunday-Thursday from 3-8 pm
 - 2702 Mayer Hall Addition
- First quiz next Friday the 13th
- Greek alphabet

What are the units of energy, in fundamental units?

A kg-m/s

B kg-m²/s

C kg-m/s²

D kg-m²/s²

E dimensionless

Announcements Monday 4/9/2012

- You are encouraged to read ahead, and try the homework over the course of the week, as we discuss the material
 - Don't wait until class discussion is over to start HW
- Final chapter 19 HW posted
- Quiz Friday
 - HW and MCAT questions on quiz
- OSD students should get me the forms **today**
- Pengfei's office hours moved to Wed 4-6pm SERF-329
- Take chances, make mistakes
- Real-world examples to come in Chapter 20
- 2 questions about charge moving across lines

Announcements Wednesday, 4/11/2012

- Remember the Tutorial Center: use it
- Quiz Friday
 - Mostly computations, some conceptual
 - HW and iClicker questions are your guide
 - I don't have any prior class quiz
 - You must bring your own Scantron form
 - Before the Quiz: Enter your 9-digit student ID
 - using "1" for "A", 7 for "U". Leave *exactly* 1 space at end.
 - Use pencil only
 - Equations will be posted tonight (Wednesday)
 - Metric prefixes
- Electric field hockey link posted
- 2 questions about charge moving across lines

How is the pace of the class?

A too slow


B about right

C too fast

Metric prefixes

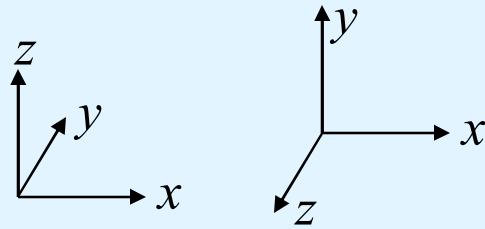
- pico p 10^{-12}
- nano n 10^{-9}
- micro μ 10^{-6}
- milli m 10^{-3}
- kilo k 10^3
- mega M 10^6
- giga G 10^9

The difference between 'm' and 'M' is a factor of a billion



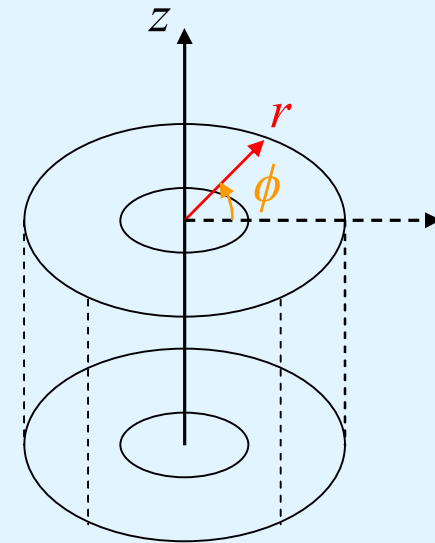
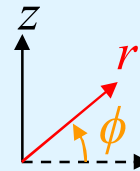
Coordinates (different than math)

- Rectangular

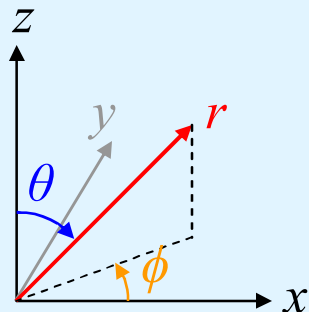


-

Cylindrical



- Spherical polar



Quiz 1

- Following directions is part of the quiz
 - **Soft pencil only**
 - While you are waiting:
 - Enter **9-digit** student ID, using 1 for A, and 7 for U
 - Leave *exactly* 1 space at end.
 - **Immediately** on getting your quiz:
 - Fill in the Test Form **first**
 - For credit, you **must fill in** the Test Form bubble
 - Your ID and Test Form are part of the quiz
-

Announcements Monday 4/16/2012

- Quiz scores should be posted today
 - Average was ~ 72 (too high?)
- My office hour (just this Wednesday) shortened to 12:30-1:30
 - TA's office hour and problem session are normal

Announcements Wednesday, 4/18/2012

- Always send me your student ID in email
- My office hour is short today: 12:30-1:30
- In over 20 years of Scantrons, the system has never been known to misread a properly marked response
 - If you got it wrong, it's because you bubbled it wrong
 - '-' means no mark detected; '?' means 2 or more marks
 - Spend your time studying the physics, not looking for a Scantron miracle
- If you need your iClicker ID, come down quickly after class
- All quizzes are cumulative since beginning of course

Announcements Friday, 4/20/2012

- How is the Tutorial Center?
 - Send me your experiences, good or bad
 - If you can, send me days/times when you were there
 - With or without times, send me your experiences anyway
- Quiz next Friday
 - Student ID has 9-digits (leaving 1 space at end).
 - Code “1” for the leading “A”
 - Penalty for misidentification
- Homework is posted. More soon.

Announcements Monday, 4/23/2012

- Quiz Friday, 4/27
 - Chapters 19 and 20
- I'm working on the Tutorial Center problem
 - I've never seen this before
- Electric Field Hockey demo

Announcements Wednesday, 4/25/2012

- All HW solutions posted
- Quiz this Friday, 4/27
 - Cumulative: whole course til now
 - Equations you will be given are posted
 - All concepts in HW and iClicker questions are your guide to what is on the quiz
 - Fill out your Scantron *before* the quiz
 - Except for Form letter

Physics 1B, Quiz 2

Eric L. Michelsen

- Right now: Enter a 9-digit student ID
 - using “1” for “A”. Leave *exactly* 1 space at end.
- Immediately on getting your quiz:
 - Fill in the Test Form **first**
- Use pencil only

notes

Announcements Monday, 4/30/2012

- I applaud those who are participating in class
 - You are engaging, and thinking
 - That helps both of us
 - Doesn't matter if you are right or wrong
- iClicker scores posted
 - You must register every quarter (using PID format I gave you)
 - If you haven't registered, you'll get credit for your existing responses when you do
 - **Provided** that your clicker is working
 - Check your clicker score on course web page

Announcements Wednesday, 5/2/2012

- Pengfei's office hours location moved **today only**
 - To SERF 434 (4th floor, south hallway)
- Quiz 2 scores posted soon
 - Average = 46.5
- New homework posted soon

Announcements Friday 5/4/2012

- All grades posted
 - Notify me within 1 week of any questions
- Several of the Quiz 2 questions were from the MCAT study guide
 - I chose the *easier* ones, because they are more focused on the concepts
- We're a little behind schedule
 - But it doesn't seem to me we're going too slowly
- After class, would someone go to TC with me and show me his/her 1BL lab text?

Announcements Monday, 5/7/2012

- Quiz Friday
 - Anyone with special consideration for this Friday's quiz must email me today
- Still working to improve Tutorial Center
 - Dr. Anderson said he will speak to the parties involved
 - Please let me know of any problems with the TC, including late or absent tutors
 - Over the summer, TC open with limited hours, to be posted at the time
- We are halfway through class

Announcements Wednesday, 5/9/2012

- Quiz Friday (Fun Day)
 - Fill in your Scantron now (except for Test Form)
 - Formulas to be given will be posted soon
 - As always, quiz covers all concepts in HW, clicker questions, and past quizzes
 - As always, there will be MCAT-like questions

Physics 1B, Quiz 3

Eric L. Michelsen

- Right now: Enter a 9-digit student ID
 - using “1” for “A”. Leave *exactly* 1 space at end.
 - Immediately on getting your quiz:
 - Fill in the Test Form **first**
 - Use **pencil only**
-

Announcements Monday 5/14/2012

- Two atoms walk out of a bar
- We're moving into magnetism
 - Many people find this a little more abstract than electrostatics
 - However, we will continue to wrap-up some electrostatics concepts with HW and on quizzes

Announcements Wednesday 5/16/2012

- There will be class on Friday

Announcements

Friday, 5/18/2012

- Quiz next Friday
 - Everything through chapter 22
- Magnetic slides posted

Announcements Monday, 5/21/2012

- Quiz this Friday
 - Everything through chapter 22
 - Review dielectric constant and EMF
 - May need to put those on this quiz
- Review your cross-products: we need 'em
- How is the Tutorial Center?
- Has anyone seen my black trenchcoat?
 - Last I remember it was in class ~3 weeks ago
- Did you see the eclipse?

Announcements Wednesday, 5/23/2012

- Quiz Friday
 - Everything through chapter 22
 - Review dielectric constant and EMF
 - May need to put those on this quiz
- Review your cross-products: we need 'em
- Updated “How to solve any problem”
 - If you get stuck at the last step, go back to step 3 and add more
- Study ideas
 - For each formula:
 - Draw a diagram depicting its use, illustrating every symbol in it
 - Describe the meaning of each symbol in words
 - Use HW problems to help
 - Review each slide, and be sure you understand the concept on it
 - Every slide is there for a reason

Physics 1B, Quiz 4

Eric L. Michelsen

- Right now:
 - Enter a 9-digit student ID, using “1” for “A”, “7” for “U”
 - There should be exactly one space at the end
- Immediately on getting your quiz:
 - First: fill in the Test Form
- For Wednesday: old iClickers take 3 batteries (not 2)
 - When replacing batteries, be sure to replace all 3
- After class, come see any demo with me

Clarification: The hollow steel tube carries the current along its length.

22 gauge is a measure of the wire’s diameter. You have all the information you need.

Announcements

Wednesday, 5/30/2012

- old iClickers take 3 batteries (not 2)
 - When replacing batteries, be sure to replace all 3
- Let me know if any of the study or problem solving ideas have been useful
 - Send me your methods that have worked for you
- When changing the world:
 - Only one in ten ideas ends up working
 - But you have to through the 9 that don't work to find the one that does
- Don't wait till next week to come to office hours
 - Beat the rush: come today
- MCAT questions give you superfluous information (just like I do)
- Please fill out the CAPE surveys
 - Be honest: your opinions matter
 - Be constructive: we all want to do better
 - Make UCSD better for yourself, and others
 - Check your UCSD email for the cape link
 - It's fun! (not really)
 - It's safe!
 - Professors can't see results until after final grades are turned in

Physics 1BL: My lab equipment ...

- A almost always works
- B usually works
- C works about half the time
- D usually doesn't work
- E rarely works

Announcements

Friday, June 1

- Curve will almost certainly be bigger than my 2C classes
- Quiz 4 scores are taken down
 - Scores are correct
 - But responses/scoring were wrong
 - I hate Excel
- Please fill out the CAPE surveys
 - Thank you to those who've already responded
 - Evaluations are taken seriously
 - Be honest
 - Be constructive: we all want to do better
 - Make UCSD better for yourself, and others
 - Check your UCSD email for **your unique CAPE link**
- It's safe!
 - Professors can't see results until after final grades are turned in
 - Professors see only aggregate results and anonymous comments

Announcements Wednesday, June 6

- You must bring your student ID to final exam
- Chapter 23 solutions posted
 - Problem 23.25 withdrawn
 - You won't need E-field from changing B-field for this course
- Please fill out the CAPE surveys
 - Thank you to those who've already responded
 - Evaluations are taken seriously
 - Be honest
 - Be constructive: we all want to do better
 - Make UCSD better for yourself, and others
 - Check your UCSD email for your unique CAPE link
- It's safe!
 - Professors can't see results until after final grades are turned in
 - Professors see only aggregate results and anonymous comments

Physics 1B, Quiz 5

Eric L. Michelsen

- Right now: Enter a 9-digit student ID
 - using “1” for “A”, “7” for “U”
 - There should be 1 blank space at end
 - Immediately on getting your quiz: Fill in the Test Form **first**
 - Use pencil only
 - Please fill out your CAPE surveys
 - It's worth 0% of your grade, but 100% of mine
 - Thank you
 - **You must bring your student ID to the final exam**
 - I will have office hours Monday next week, and another if needed, to be posted
-