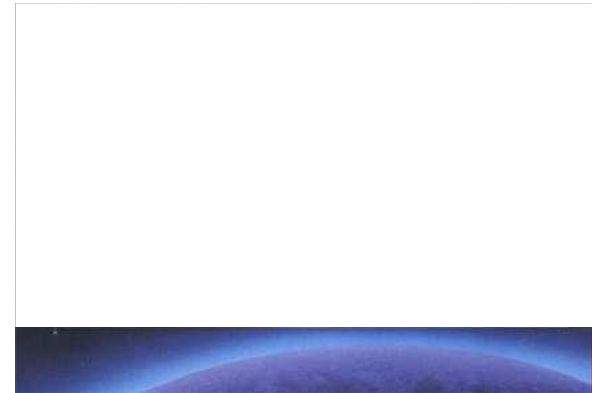
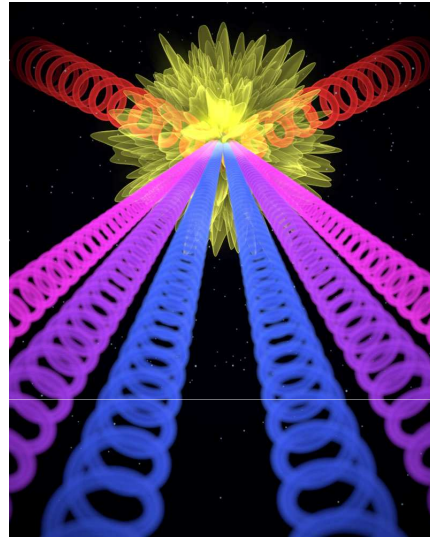
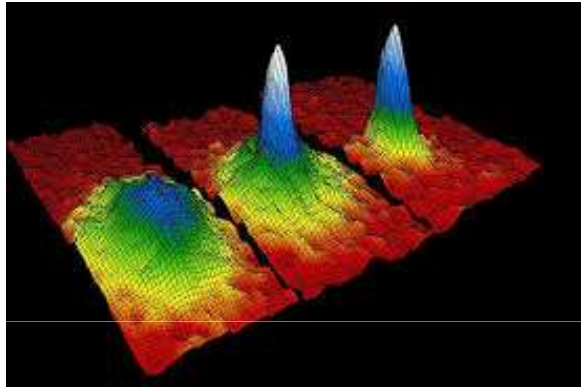


# Welcome to PHYS 2130

## General Physics III: Modern Physics for Engineers



**Profs. Andreas Becker and Noah Finkelstein**

<http://www.colorado.edu/physics/phys2130/>

# PHYS 2130

## General Physics III: Modern Physics for Engineers

- Introduction
- Course
  - Why are we here and what will we do?
  - Administrative Stuff
  - Expectations
- Review of Classical Physics

# iClicker



Do you have an iClicker (Code: DC)?

(A) Yes, I can respond

(B) No, I do not have a clicker

Swap clicker code to DC

Hold down On/Off Switch 4 seconds

# iClicker



Have you used Clickers in a prior class?

(A) Yes

(B) No

Swap clicker code to DC

Hold down On/Off Switch 4 seconds

# iClicker



Did you find them useful?

(A) Yes

(B) No

Swap clicker code to DC

Hold down On/Off Switch 4 seconds

## Why are you in this class?

- (A) I am interested in learning modern physics, although this is not a required course
- (B) I am interested, but it is also required course
- (C) Only because the course is required
- (D) Other / Multiple reasons

# Modern Physics: Focus on Quantum Mechanics

## Classical physics (pre-quantum):

All about motion of macroscopic objects and electric and magnetic fields and some other stuff

## Quantum:

All about microscopic objects

- Properties of atoms, molecules ...
- How light interacts with material
- Basis of modern technology
- Understanding and applying concepts
- Interpretation and probability

# PHYS 2130: Course

**Syllabus:** <http://www.colorado.edu/physics/phys2130/>

## **Before Class:**

Reading assignments – see course website

(This week: Knight 20.1-20.6, 21.1-21.3)

Get to know the main ideas and terms

## **In Class:**

Explore, develop basic ideas and understanding

Active participation (via Clickers – and beyond)

## **After Class:**

Master and retain ideas through use in (extensive) HWs



# PHYS 2130: The Team

## **Lectures:**

Andreas Becker: Lectures in weeks 1-10, up to Spring Break  
(mostly fundamentals of quantum mechanics)

Noah Finkelstein: Lectures in weeks 11-15  
(mostly applications of quantum mechanics)

## **Graduate TAs/Graders:**

Jessica Hoy (Lead TA)  
Ananda Das (Grader)

## **Undergraduate Learning Assistants:**

Aidan Bohenic  
Omkar Ramachandran  
Marcus Schmidt

# PHYS 2130: Exams and Grades

- Two Midterms (each): 17.5%
  - Thurs, Feb 11, 7:30 - 9:00 PM
  - Thurs, Mar 17, 7:30 - 9:00 PM
- Final (Tues, May 3, 1:30 - 4:00 PM): 25%
- Weekly Homework (due Thursdays at 5PM): 40%
  - starts next week
- Clickers and other extra credit opportunities reduce exam weight -> see course website

# PHYS 2130: Homework

- Homeworks are due on Thursdays at 5PM
  - Multiple choice questions and short essays will be submitted online via D2L
  - Long answer questions will be submitted in wooden box in Physics Help Room
- HW 1 will be due Thursday, Jan 21, at 5PM.
- No HW in PHYS 2130 exam weeks
- Homework will be returned after one week (usually on Fridays). If you feel your HW was graded incorrectly or unfairly, contact us within two weeks after return.
- Drop your lowest HW score at the end of the semester.

# Expectations

- The material is challenging, and involves more than just memorizing...
- You will be expected to think and analyze new situations
- Most students are capable of succeeding in this class – this means you!
- We will try to create a course that facilitates your learning; **you** need to **participate**

# Expectations

If you would like to do well, ask:

Am I...

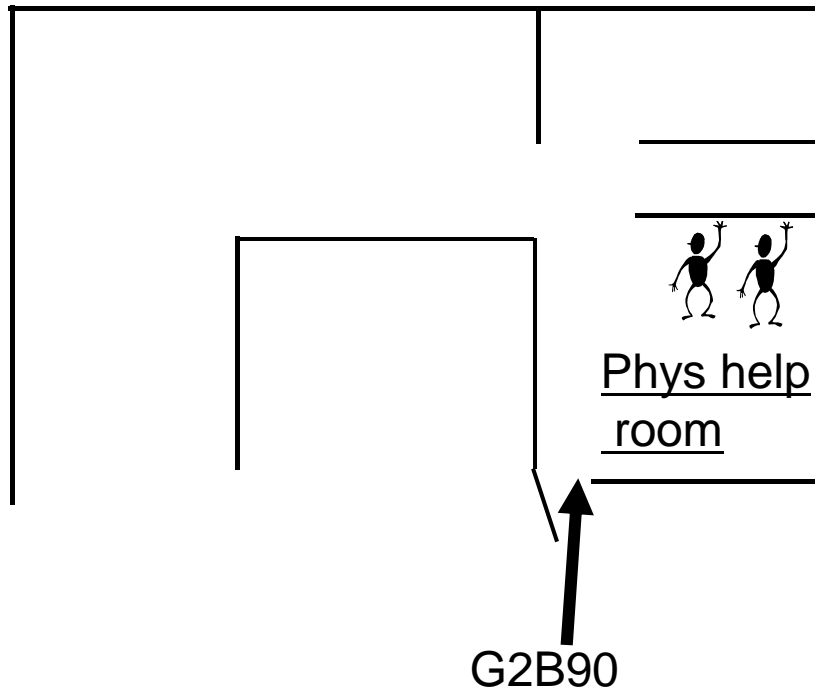
- Coming to class (w/ clicker and prepared) and **actively** participating?
- Reviewing the class notes?
- Doing all HW on time?
- Trying to understand the material, not just ‘get it done’ ?
- Asking questions when confused

# Team is here to help

## Problem solving sessions:

Best education is one-on-one examination of thinking with feedback.

**Main learning time!**



**Regular Weekly Hours:**  
*(start next week)*

Mo: 11-12 (after class)

Tues: 2-5

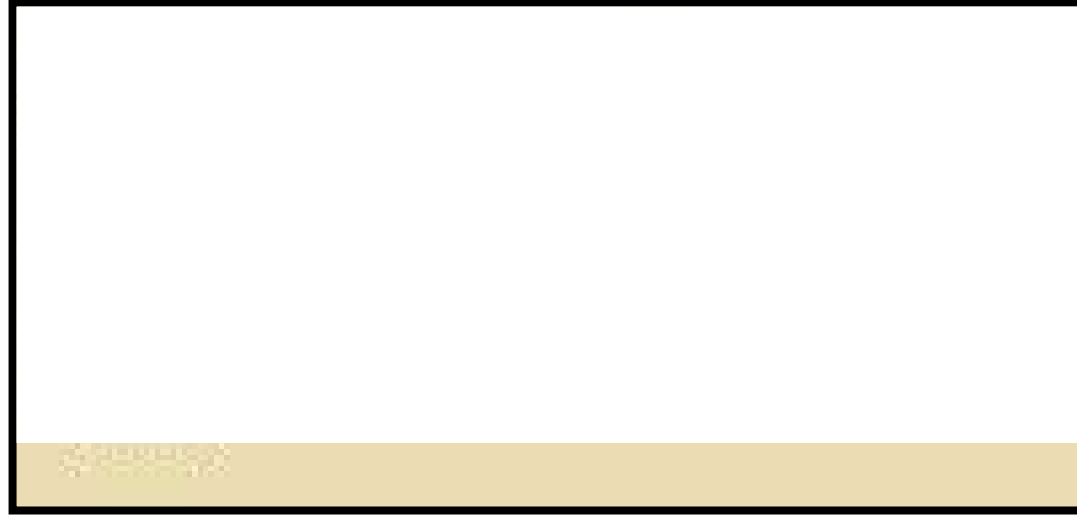
Wed: 11-12 (after class)  
2-5

Thurs: 2-5

Homework is *hard*, but ok. You will learn a lot when working together. We coach, help you to interact – but will **not** *give or check answers*

# Expectations

Group work is **encouraged** (in fact, hopefully, necessary)



What is authorized:

- working with others to make sense of questions
- collectively sorting out the answer (incl. reasoning)
- writing up your own solution in your own words

What is not authorized:

- telling other students the answer
- representing someone else's work as your own
- letting others represent your work as theirs

In Classical Mechanics, can the following equation be derived?

$$\vec{F}_{net} = \frac{d\vec{p}}{dt} = m \frac{d\vec{v}}{dt}$$

A) Yes

B) No



# Quotes about Quantum Mechanics

*Quantum mechanics is the greatest accomplishment of human race – Carl Wieman*

*For those who are not shocked when they first come across quantum theory cannot possibly have understood it – Niels Bohr*

*I think I can safely say that nobody understands quantum mechanics – Richard Feynman*