

Physics I for Physicists and Astronomers 29:27



Professor Vincent Rodgers

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OFFICE HOURS: Weds 3:30 – 5:00 PM

Thurs 3:30 – 5:00 PM

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Department of Physics and Astronomy



Instructional Material:

- *PHYSICS* by Resnick, Halliday, Krane
Volume 1 5th Edition
- Lab Manual for 29:27
(sold at Iowa Bookstore)
- Wiley PLUS
<http://edugen.wiley.com/edugen/secure/index.uni?protocol=http>
Note: this is the database of *Fundamentals of Physics* by Halliday Resnick and Walker. This is a different book from our textbook but we will use their database. Our book is *Physics* Halliday, Resnick and Krane.

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Course Description:

- The emphasis in this course is on the rigorous structure of classical physics and the development of the ability to solve problems.
- Topics include mechanics, heat, and sound. This course is intended for physics and astronomy students.

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- Lecture is 75% of final grade:
This will be conducted by Prof. Vincent Rodgers.
Demonstrations will be supplied by Dale Stille
- Laboratory is 25% of the final grade. The best 10 out of 11 of the lab grades will be used to calculate the final grades. The lab instructor is Daping Du. See the lab web page [here](#).

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Homework



There will both graded and ungraded assignments.

- The graded assignments will be given through the Wiley Plus Web site [here](#).
- Ungraded assignments will be given on the [29:027 ICON](#) link under “News”. These assignments are designed to provide you with the kind of problems that you will see on the exams. They are also designed to get you ready for the discussions in the class and the recitation classes. An “A” student will be well versed with these problems.

Labs and Recitations



- Labs

there are two lab sections for this class. See your schedule to determine your section.

Mr. Daping Du will be your lab instructor.

- Recitations (Room 301 VAN)

the Thursday 12:30 – 1:20 PM period is a problem solving session that I will moderate. Problem solving and exam preparation will be the key elements of these discussions.

Course Goals



- Produce outstanding astronomers and physicists and place University of Iowa students in arenas where they are responsible for developing new technologies/science and maintaining the present technologies
- Specific Goals:
 - RESPONSIBILITY
 - ACCURACY
 - PHYSICAL INTUITION

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Grading for Lecture

- Your final grade will be computed from the following from a total of 250 points. Each assignment and exam will be graded so that 50% will be considered just barely passing or the grade *D* work for that assignment. The grades will be weighed as follows:
 - 150 pts. 3 exam scores (50 pts. each)
 - 50 pts. : Homework
 - 50 pts. : Final Exam
- A typical distributions of grades will be:
 - 250-210 *A*'s
 - 209-170 *B*'s
 - 169-130 *C*'s
 - 129-90 *D*'s
 - below 89 *F*

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Exam Schedule

- 18 September, 2009 Exam I
- 16 October, 2009 Exam II
- 20 November, 2009 Exam III
- 14 December, 2009 2:15 PM Final

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General Policy



- Click on the above for the College of Arts and Sciences Policies and Procedures

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Homework Style

- E Grade Homework on the Web (more later) – these problems will form the core of your homework grade
- Problems from HRK are highly suggested but will not be graded. These problems will reflect the exam questions.

The model for study will be similar to a music class. The Exams are your recitals.



Studying

- Exams are designed to determine your ability to solve problems with accuracy.
- Suggestion: Use a 3-Ring binder for notes.
- Suggestion: Use ink for problem solving.
- Look at your Physics notes *at least* 30-45 minutes *everyday* and not less than 6 hours per week in total.
- Only peek at known solutions then close the solution and try to reconstruct the logic on your own. Peek again if you come to an impasse.
- Work together only if you can always contribute ideas and strategies for problem solving.

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Study Assistance



- The Department of Physics and Astronomy has a Library on the 3rd Floor of Van Allen Hall.
<http://www.lib.uiowa.edu/physics/>
- The Department of Physics and Astronomy has a tutorial room. Times will be posted shortly.
- The Department has a Commons Room for Physics and Astronomy majors, 316 VAN
- My office hours are Tues 10:00-11:30 AM, Thur 10:00 – 11:30 AM and by appointment

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Modern Physics

Four known forces of the Universe:

1. Electricity and Magnetism
2. Weak Nuclear Force
3. Strong Nuclear Force
4. Gravitation

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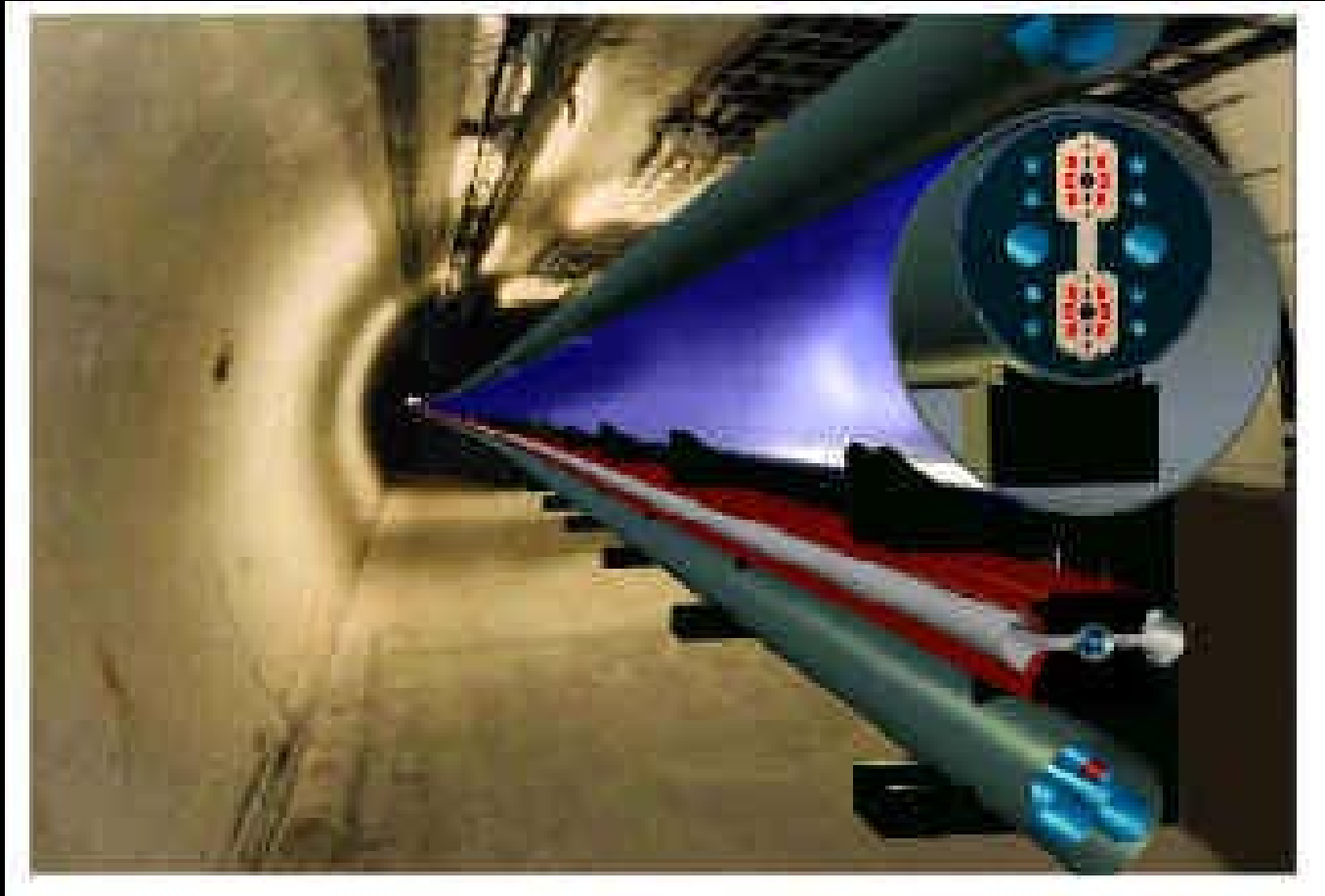


Principles in Physics

- Classical Mechanics of Particles and Fields
- Quantum Mechanics
- Quantum Field Theories
- Statistical and Thermodynamics

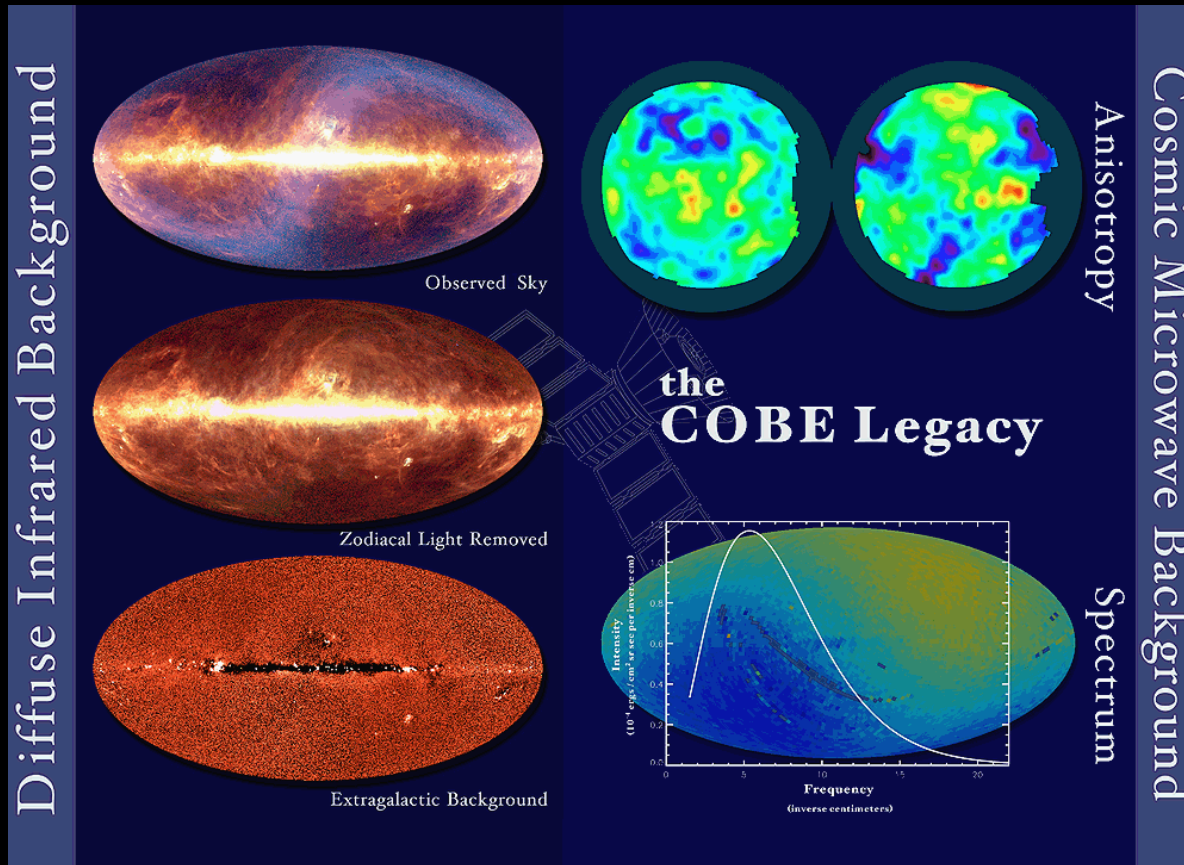
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Fermi Lab



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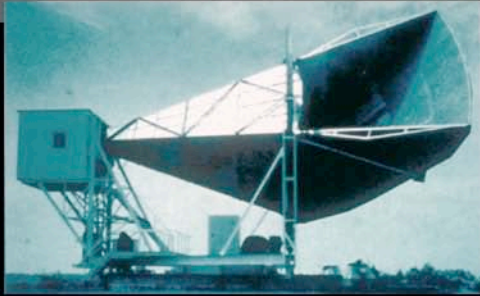
COBE Experiment



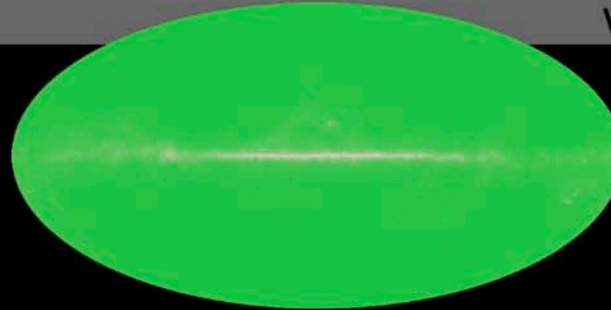
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WILKINSON MICROWAVE ANISOTROPY PROBE

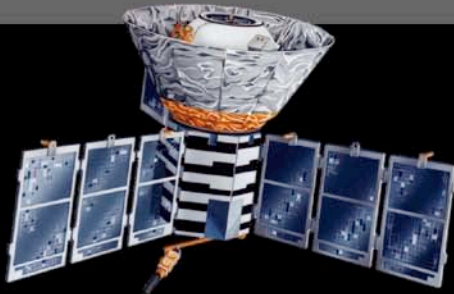
1965



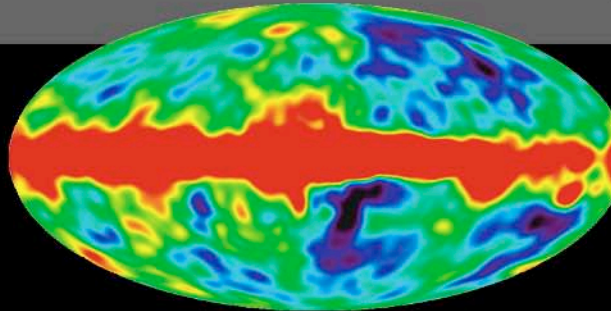
Penzias and
Wilson



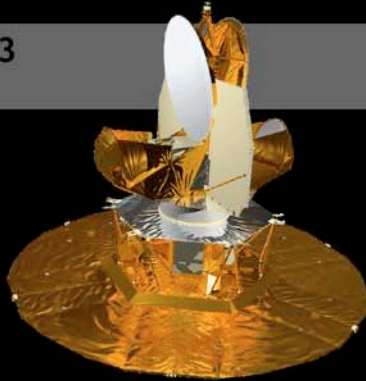
1992



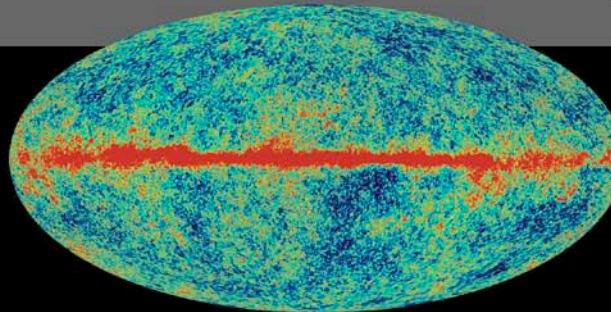
COBE



2003



WMAP



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www.physics.uiowa.edu



- KEK Japan measuring neutrinos

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Universe is 13.7 billion years old with a margin of error of close to 1% .



First stars ignited 200 million years after the Big Bang.

Light in WMAP picture from 379,000 years after the Big Bang.

Content of the Universe:

4% Atoms, 23% Cold Dark Matter, 73% Dark energy.

Dark energy more like a "cosmological constant" than a negative-pressure energy field called "quintessence" .

Expansion rate (Hubble constant) value: $H_0 = 71$ km/sec/Mpc (with a margin of error of about 5%)

New evidence for Inflation (in polarized signal)

For the theory that fits WMAP data, the Universe will expand forever.

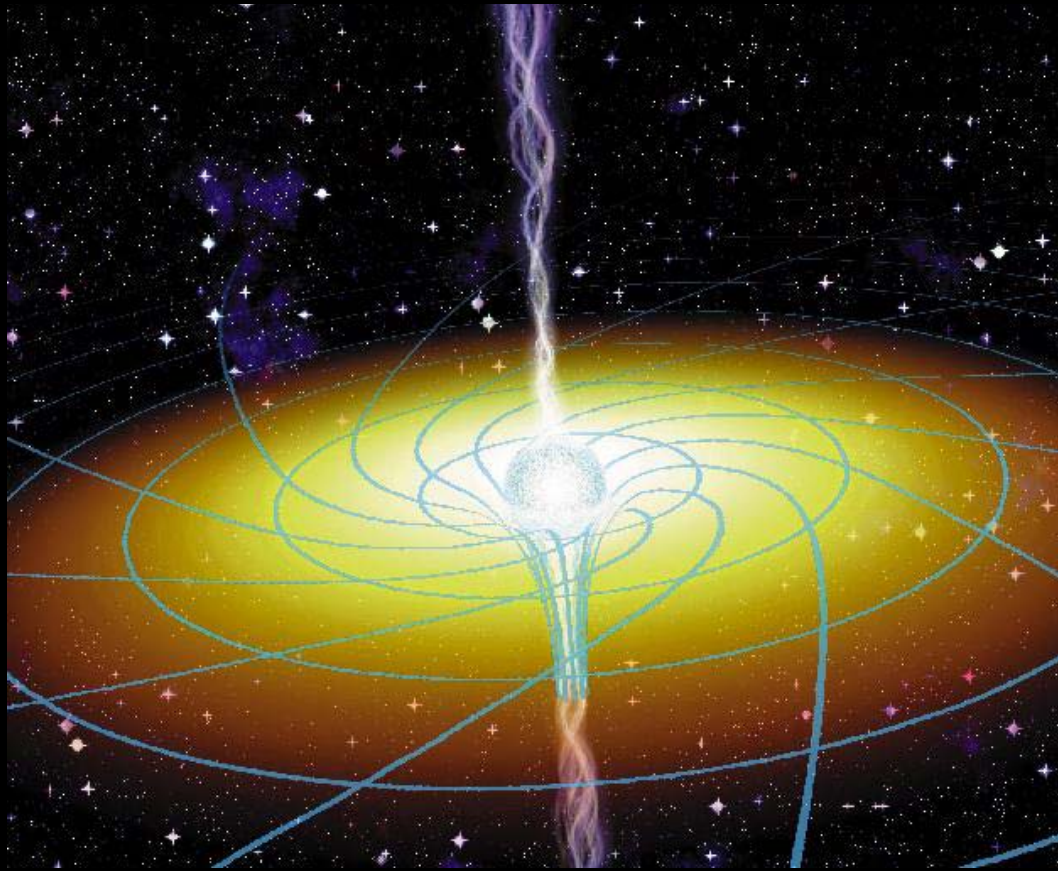
The nature of the dark energy is still a mystery.

Hubble Telescope



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Black Holes?



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Other Things

- Photonics
- Nanomachines
- Neutrino detectors
- Gravitational Wave detectors
- Hydrogen Cell Cars
- Biological Mathematics

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Stuff I work on

- String Theories, Gravitational Theories and Quantum Chromodynamics

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The Faculty



UW
LA
CROSSE

Chair

Mary Hall Reno

Professors Emeriti

Raymon T. Carpenter

Nicola D'Angelo

Louis A. Frank

Georg E. Knorr

Edward R. McCliment

John S. Neff

Edwin Norbeck

Gerald L. Payne

Professors

David R. Andersen

Thomas F. Boggess Jr.

Michael E. Flatté

John A. Goree

Donald A. Gurnett

Richard Hichwa

Philip E. Kaaret

Paul D. Kleiber

Craig A. Kletzing

William H. Klink

Karl E. Lonngren

Mark T. Madsen

Usha Mallik

Robert L. Merlino

Yannick Meurice

Robert L. Mutel

Yasar Onel

Wayne N. Polyzou

Mary Hall Reno

Vincent G. J. Rodgers

John W. Schweitzer

Jack D. Scudder

Frederick N. Skiff

Arthur L. Smirl

Steven R. Spangler

Associate Professors

Kenneth G. Gayley

Jane M. Nachtman

Charles R. Newsom

John P. Prineas

Markus Wohlgenannt

Assistant Professors

Gregory G. Howes

Cornelia C. Lang

Randall L. McEntaffer

Craig E. Pryor

Visiting Assistant

Professors

Ugur Akgun

Helen M. Bryce

Other Resources



- To help answer question like:
“what do physicists do?”, “where will I work”, “how can I prepare for a physics career”
- American Physical Society
- Physics Central
- Society of Physics Students
- UI - SPS