

Astronomy 102
Fall 2005

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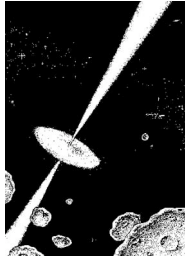
Astronomy 102
What are we going to talk about today?

- Goal of the course
- Who am I?
- Who are you?
- Course information:
 - Text books
 - Personal Response System (PRS)
 - Lectures
 - Recitations
 - Homework
 - Exams
- Astronomy 102 survey
- Mid-lecture break
- Sizes and distances in astronomy

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Astronomy 102
Goal of the course

- Astronomy 102 focuses on a discussion of exotic phenomena, such as black holes, wormholes, time warps, space-time curvature, hyper space, and the Big Bang, in the context of Einstein's theories of relativity.
- Most of the discussions will be qualitative in nature.



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Astronomy 102 Goals of the course

- To **demystify** black holes, the Big Bang, and relativity, to enable you to evaluate critically the things you read about them in the press and in popular science and science-fiction literature.
- To provide you with a glimpse of the processes by which scientific theories are conceived and advanced in general.
- I hope that by the end of the course you will understand and retain enough to be able to offer correct explanations of black holes and such to your friends and family, and that you will retain a permanent, basic understanding of “how science works.”

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Astronomy 102 Who am I?

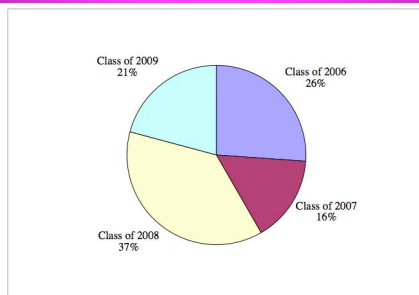
- I am Frank Wolfs, Professor in Physics and Astronomy .
- I am an experimental nuclear physicist, trying to produce the state of matter that existed a few microseconds after the Big Bang at Brookhaven National Laboratory on Long Island. I am also looking for Dark Matter in the Boulby mine in England.
- I consider teaching a very component of my job, and will do whatever I can to ensure you succeed in this course.



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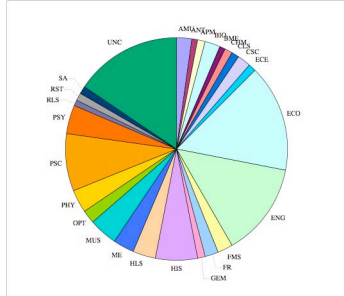
Astronomy 102, Fall 2005 Who are you?



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Astronomy 102, Fall 2005 Who are you?



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Astronomy 102, Fall 2005 Course Information

- **Lectures:**
 - Tuesdays and Thursdays: 2.00 pm – 3.15 pm (Hutch 141)
- **Recitations will start on Tuesday September 16:**
 - Tuesdays: 3.25 pm – 4.40 pm (B&L 315)
 - Wednesdays: 3.25 pm – 4.40 pm (B&L 315)
 - Thursdays: 3.25 pm – 4.40 pm (B&L 416)
 - Thursdays: 6.15 pm - 7.30 pm (B&L 269)
- **Midterm Exams:**
 - Tuesday, October 11, 2.00 pm – 3.15 pm (Hutch 141)
 - Thursday, November 17, 2.00 pm – 3.15 pm (Hutch 141)
- **Final Exam:**
 - Tuesday, December 20, 4.00 pm - 7.00 pm (Hutch 141)

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Astronomy 102, Fall 2005 Course Information

- **Course home page:**
<http://teacher.pas.rochester.edu/ast102/ast102homepage.htm>
- **Final course grade will be the weighted average of:**
 - Midterm exams and final exam (25% each, 75% total)
 - Homework (25%)
- **Note:**
 - Grades will not be curved.
 - Class participation may improve your grade.

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Astronomy 102, Fall 2005 Course Information

- **Textbooks:**
 - **Required:**
 - Kip S. Thorne, Black holes and time warps.
 - **Recommended:**
 - Michael A. Seeds, Foundations of astronomy. This book is also used in AST 105 and AST 104.
 - Stephen Hawking, A brief history of time.
 - Joseph Silk, The Big Bang.
- The recommended books will be on reserve in the PAS library.

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- During lecture, your knowledge will be challenged with various conceptual questions.
- Your answers to in-class quizzes and concept tests will be collected using the PRS system (this allows me to provide immediate feedback on your understanding of the material being discussed).
- PRS transmitters can be rented from the bookstore.

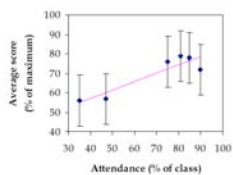


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90% of success is showing up. - Woody Allen

- All members of the class are expected to attend all of the lectures and recitations.
- This is for your own good! You will very probably get a better grade if you go to class, as is demonstrated by these average test score and average attendance data from past AST 102 classes.



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How big is that? Using scientific notation.

- Sizes of important astronomical objects exhibit such a great range that fixed-decimal-point number notation isn't practical. Instead, we will be using scientific notation.

| | cm | km | ly |
|---|----------------------|----------------------|----------------------|
| Diameter of a hydrogen atom | 1.1×10^8 | 1.1×10^{13} | 1.1×10^{26} |
| Diameter of a human hair | 8.0×10^3 | 8.0×10^8 | 8.5×10^{21} |
| Diameter of a penny | 1.9×10^9 | 2.0×10^5 | 2.1×10^{18} |
| Diameter of Rochester | 2.0×10^6 | 2.0×10^1 | 2.1×10^{12} |
| Diameter of the Earth | 1.3×10^9 | 1.3×10^4 | 1.3×10^9 |
| Diameter of the Moon | 3.5×10^8 | 3.5×10^3 | 3.7×10^{10} |
| Diameter of the Sun | 1.4×10^{11} | 1.4×10^6 | 1.5×10^7 |
| Diameter of the Milky Way galaxy | 1.6×10^{23} | 1.6×10^8 | 1.7×10^5 |
| Distance to Buffalo | 1.0×10^7 | 1.0×10^2 | 1.1×10^{11} |
| Distance to the Moon | 3.8×10^{10} | 3.8×10^5 | 4.1×10^8 |
| Distance to the Sun | 1.5×10^{13} | 1.5×10^8 | 1.6×10^8 |
| Distance to the next nearest star | 3.8×10^{18} | 3.8×10^{13} | 4.0×10^9 |
| Distance to the center of the Milky Way | 2.6×10^{22} | 2.6×10^{17} | 2.7×10^4 |
| Distance to the nearest galaxy | 1.6×10^{23} | 1.6×10^{18} | 1.7×10^5 |

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The scale of the cosmos

- Let's now sit back and enjoy a video that focuses on a discussion of the scale of the cosmos.

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