"Men and women are not content to comfort themselves with tales of gods and giants, or to confine their thoughts to the daily affairs of life; they also build telescopes and satellites and accelerators, and sit at desks for endless hours working out the meaning of the data they gather."

… Steven Weinberg

(Nobel Prize in Physics 1979)

PHY138 – Electromagnetism
Lecture 0

- Your new instructor: *Prof. Kimberly Strong*

PHY138 – Electromagnetism
Lecture 0

- Your new instructor: *Prof. Kimberly Strong*

- My office: MP710A
- My telephone: (416) 946-3217
- Email: strong@atmosp.physics.utoronto.ca

PHY138 – Electromagnetism
Lecture 0

- Your new instructor: *Prof. Kimberly Strong*

- My office: MP710A
- My telephone: (416) 946-3217
- Email: strong@atmosp.physics.utoronto.ca

- Tentative office hours: Tuesdays 12-1 and Fridays 3-4, or by appointment

Electromagnetism Quarter

- 6 weeks: January 8 to February 16, 2007

- Home page for this quarter
  (stay tuned for content):

  http://www.atmosp.physics.utoronto.ca/people/strong/phy138/phy138.html

Who Am I?

Who Am I? What Do I Do?

Professor of Physics

- Teaching
  - → PHY138, PHY315, PHY140 ...
- Research
  - → Scientist - Atmospheric Physicist
  - → Supervision of graduate students and post-doctoral fellows

Our First In-Class Quiz

When I grow up, I want to be:

A. A doctor
B. A physicist
C. A scientist (but, sadly, NOT a physicist)
D. None of the above
E. I don't know yet

Our First In-Class Quiz

When I grow up, I want to be:

A. A doctor
B. A physicist
C. A scientist (but, sadly, NOT a physicist)
D. None of the above
E. I don't know yet
F. Any of the above!

What Do Scientists Do?

- Our goal is to expand human knowledge
- We study the world around us to understand it
- We explain how and why things happen, and predict what will happen next
- We develop theories based on observations
- We try to use what we have learned to make our world a better place

Do You Want to Become a Scientist? You need:

- A strong desire to learn new things!
- Intelligence, curiosity, and imagination
- Hard work, enthusiasm, patience, and tenacity
- Enjoyment of problem-solving
- Attention to detail
- An ability to communicate your ideas
- Integrity, honesty, and responsibility
- Respect & appreciation for your predecessors

The Rewards

- Learning new things!
- Contributing to human knowledge
- Making a difference
- Knowing that what you are doing is, or will be, valuable to someone, somewhere
- Opportunities to travel and collaborate with scientists around the world
- Many career possibilities

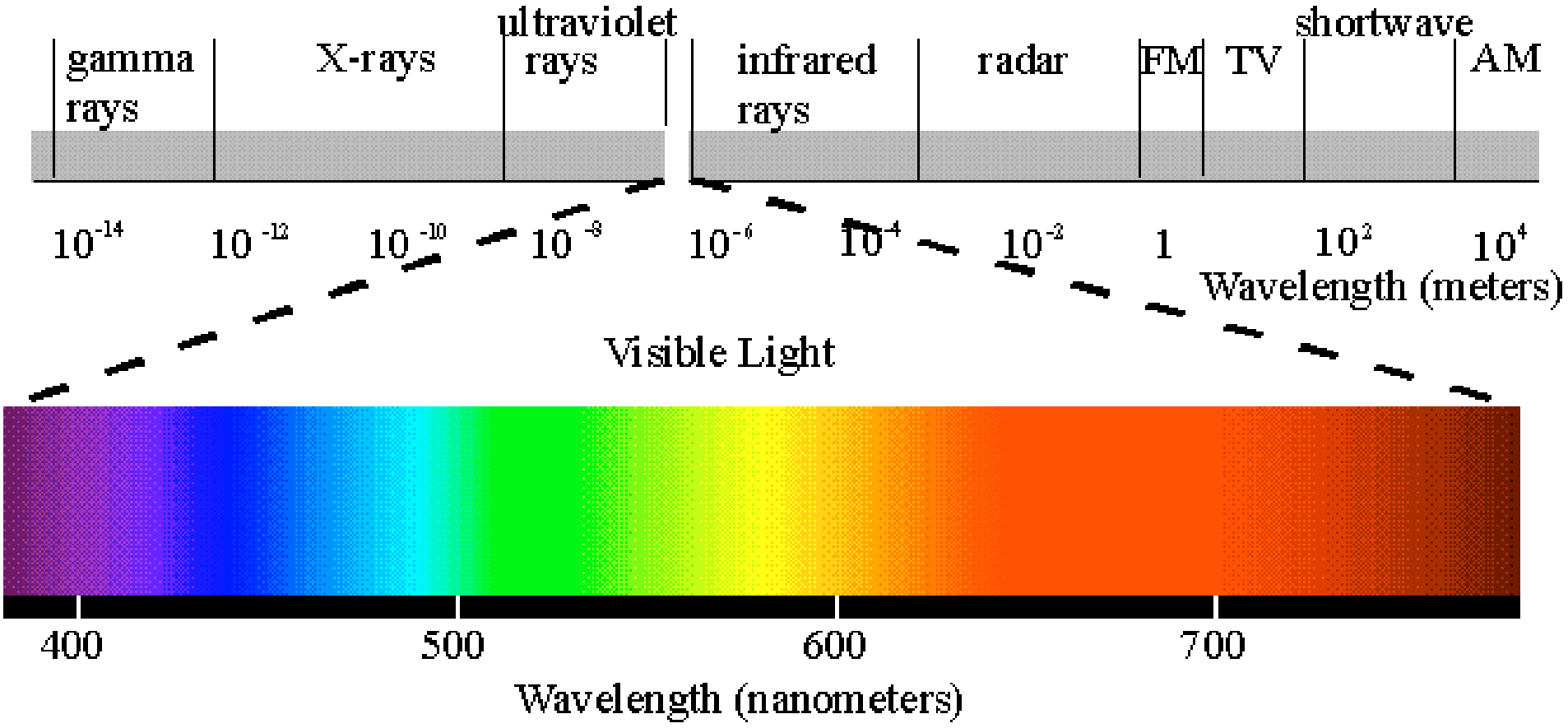
Atmospheric Physics

the application of physics to the study of the evolution and present state of the Earth's atmosphere

My Research - Experimental Atmospheric Physics

- Remote sounding of atmospheric composition from the ground, balloons, and satellites
- Ultraviolet-visible-infrared spectroscopic techniques

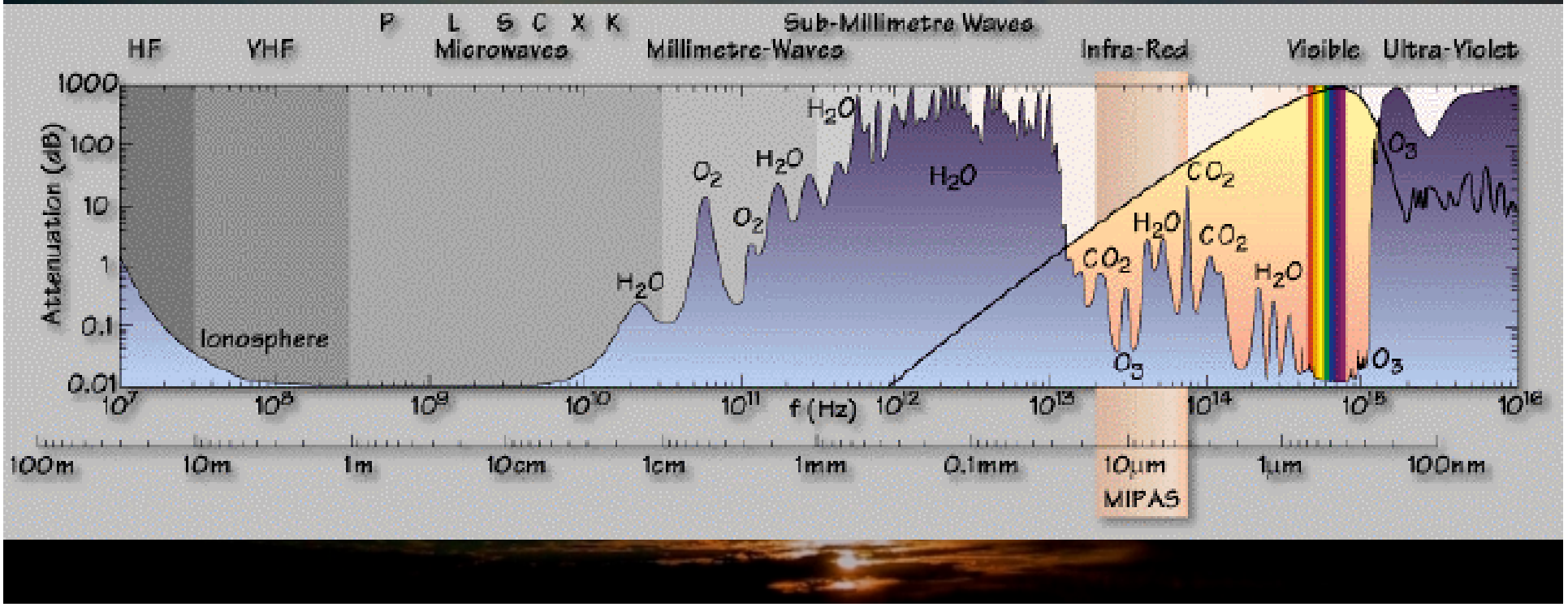
Electromagnetic Spectrum



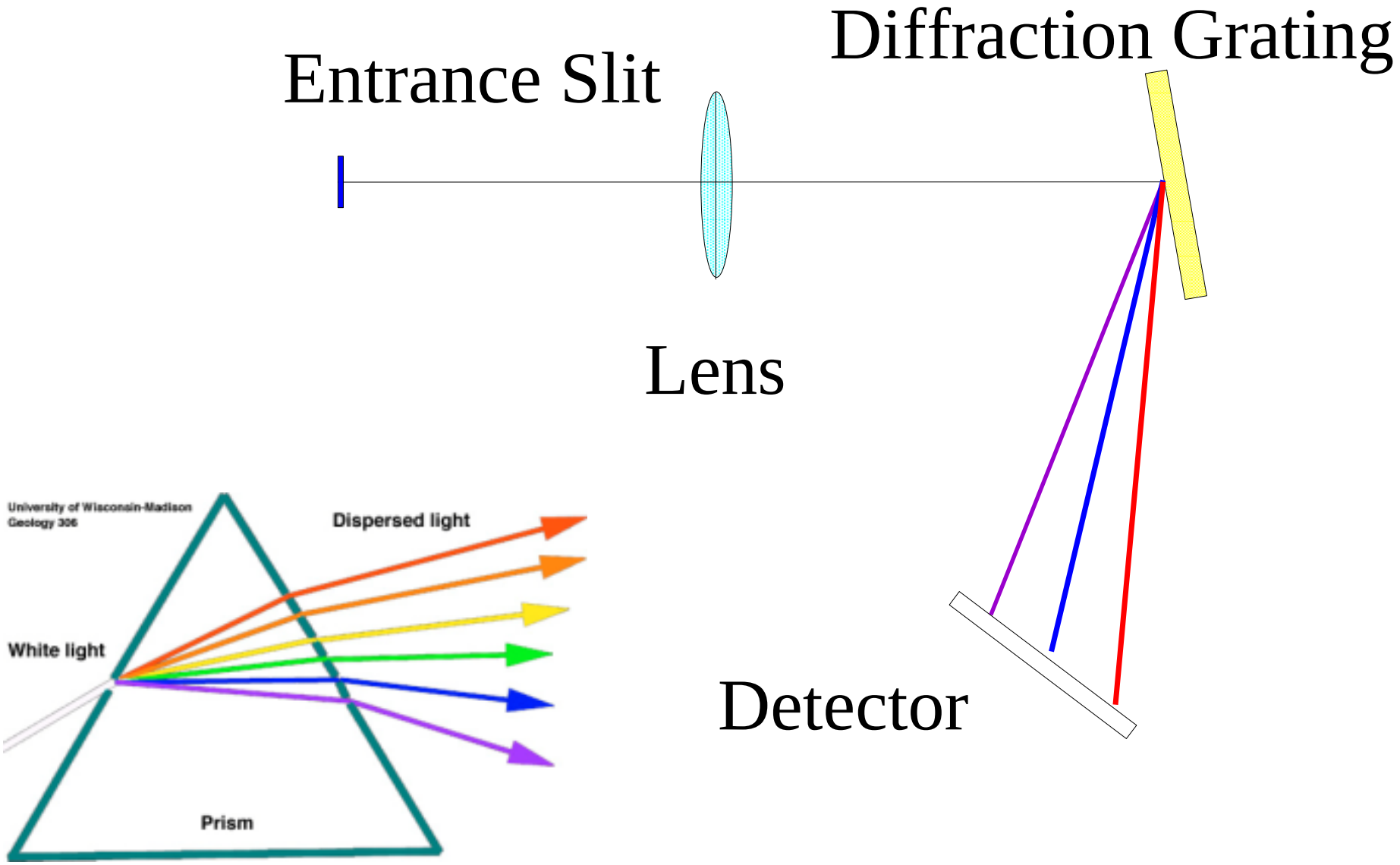
Atmospheric Remote Sounding

"Measurement at a distance"

- Information is carried by electromagnetic radiation
- Based on spectroscopy which is the study of EM radiation that has interacted with matter

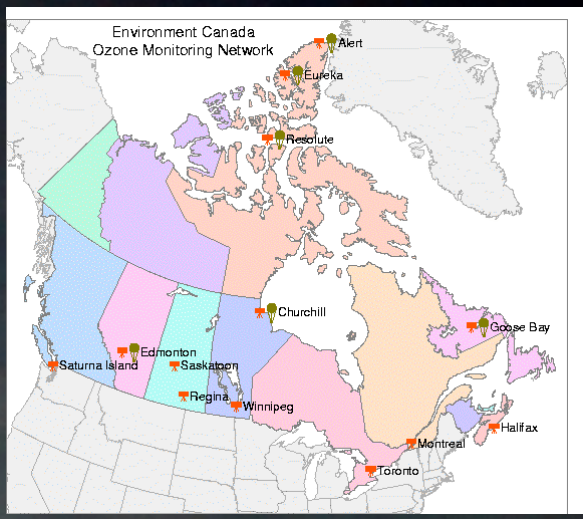


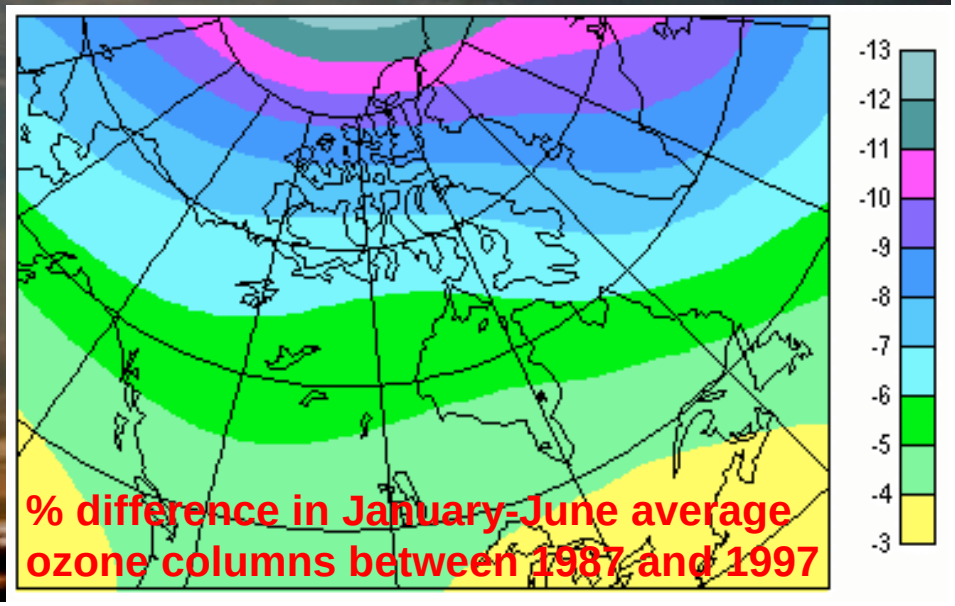
Our Basic Tool: Spectrometer



Research Projects

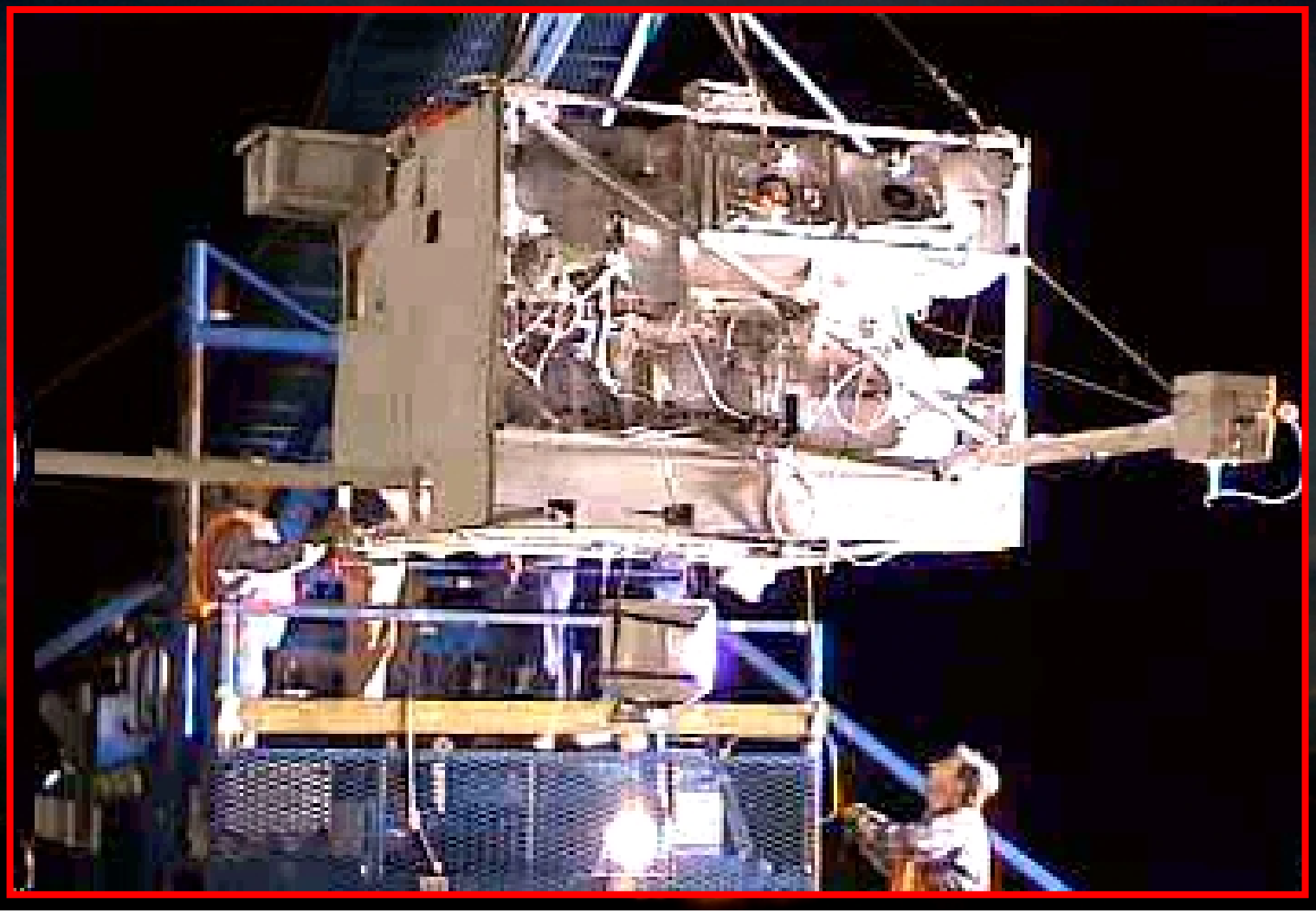
- Arctic ozone depletion



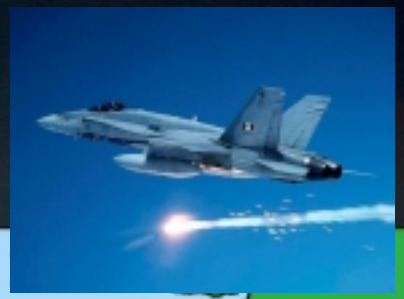


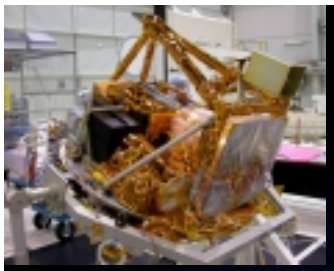
Research Projects

- MANTRA balloon campaigns to study ozone layer

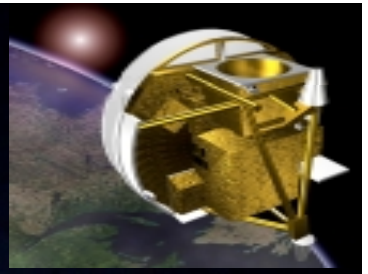


MANTRA 98: “The one that got away”



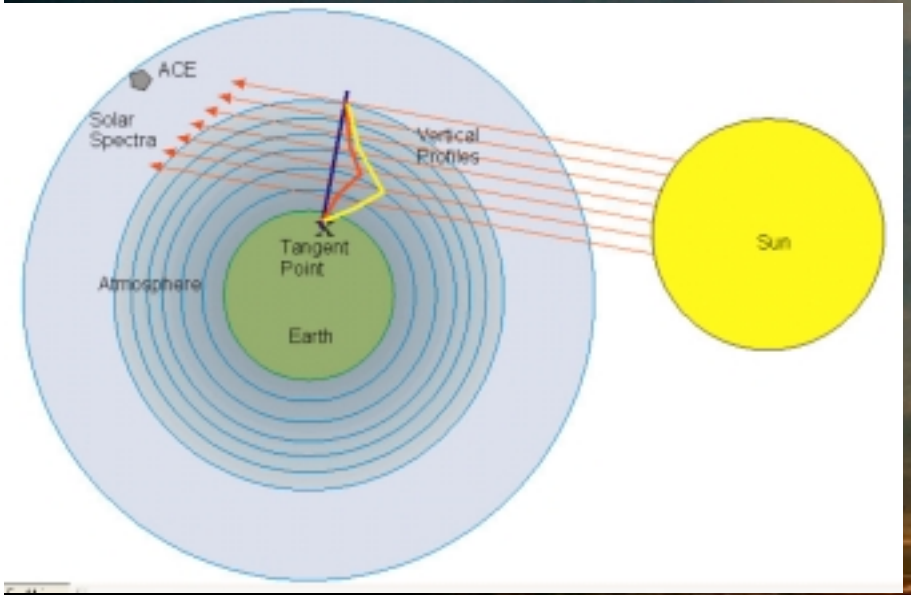


Research Projects



Atmospheric Chemistry Experiment

- Carries two instruments to measure gases and aerosols
- Goal: to gain a better understanding of stratospheric ozone processes



Research Projects

U of Toronto Atmospheric Observatory

- Daily measurements - air quality and the ozone layer

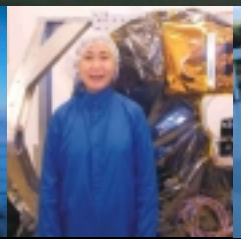
Science is a Team Effort















How Did I Become a Scientist?
We are all scientists when young!

How Did I Become a Scientist?

- B.Sc., Memorial University of Newfoundland
- D.Phil., Atmospheric Physics, Oxford
- Post-doctoral fellow, Cambridge & York U

Back to PHY138….

Syllabus for Q3 - Electromagnetism

(parts of) Chapters 25, 26, 28, 29, 30, 31, 32

- Electric Forces and Electric Fields
- Electric Potential Energy
- The Electric Potential
- Equipotentials and Energy in Capacitors
- Currents, Resistance, and Resistivity
- Circuits and Kirchoff's Laws
- Magnetic Fields and Magnetic Force

Feedback from You - 1 (Surveys and Representative Assemblies)

Lectures

- Like announcements, demos, animations
- Clicker questions - useful
  - like to have them solved on screen
  - request for challenging questions!
- Student questions - mixed reaction
  - request to read the questions answered
  - I will try to limit my answers to physics Q's
- Examples - you want more ...

Feedback from You - 2 (Surveys and Representative Assemblies)

Tutorials

- Mixed response to Student Workbook Q's
- Request to post the list of Student Workbook questions on the web
  - I will do this, along with the suggested problems
- I will give TAs solutions to both, so you and your TA can decide what to cover each week
- We want the tutorials to be a group activity, not just watching the TA solve problems

Dates to Remember for the First Week of Q3 ...

- The first week's reading assignment is **Chapter 25** of Knight, Sections 25.1 to 25.6

Dates to Remember for the First Week of Q3 ...

- The first week's reading assignment is **Chapter 25** of Knight, Sections 25.1 to 25.6
- ***10:00 AM, Monday, January 8:***
  Finish the first Mastering Physics pre-class quiz on this reading assignment

Dates to Remember for the First Week of Q3 ...

- The first week's reading assignment is **Chapter 25** of Knight, Sections 25.1 to 25.6
- ***10:00 AM, Monday, January 8:***
  Finish the first Mastering Physics pre-class quiz on this reading assignment
- ***11 AM, Monday, January 8:***
  Our first lecture of 2007 here in Con. Hall

Dates to Remember for the First Week of Q3 ...

- The first week's reading assignment is **Chapter 25** of Knight, Sections 25.1 to 25.6
- ***10:00 AM, Monday, January 8:***
  Finish the first Mastering Physics pre-class quiz on this reading assignment
- ***11 AM, Monday, January 8:***
  Our first lecture of 2007 here in Con. Hall
- ***11:59 PM on Friday, January 12:***
  Finish the first MP problem set

Have a great break!

(and read Chapter 25)

See you on January 8