

PSU/Schuylkill Physics and Astronomy Animations Project: What's New

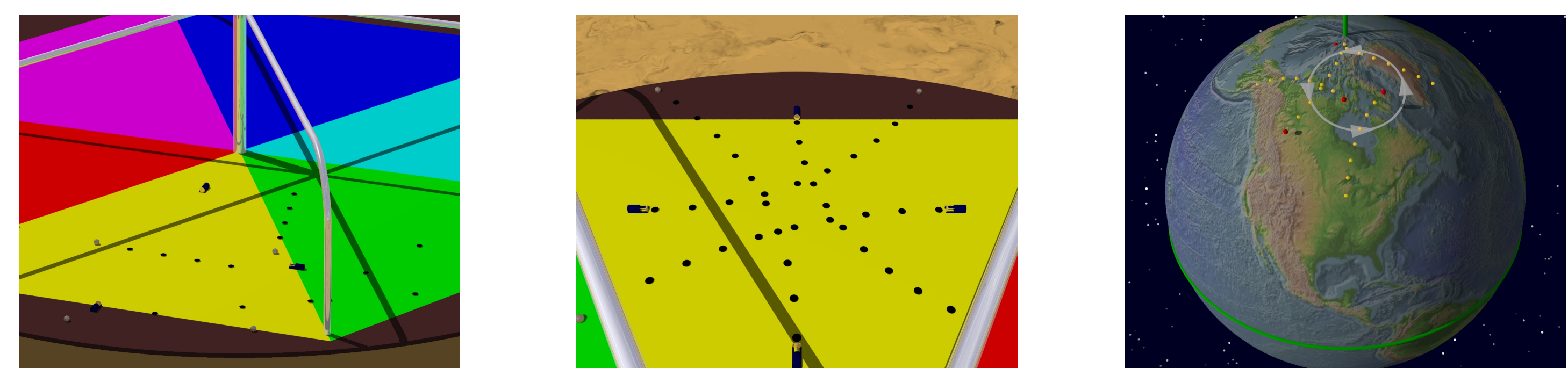
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Abstract

This poster is an update on the Animations for Introductory Physics and Astronomy project at Penn State Schuylkill. This project was initiated to help students visualize aspects of 3-dimensional situations where traditional static drawings were seen as inadequate. The animations have been used to portray a wide variety of dynamical systems and processes for physics and astronomy topics typically presented in the advanced high school through introductory college level.

http://phys23p.sl.psu.edu/phys_anim/Phys_anim.htm

New Animations: Mechanics

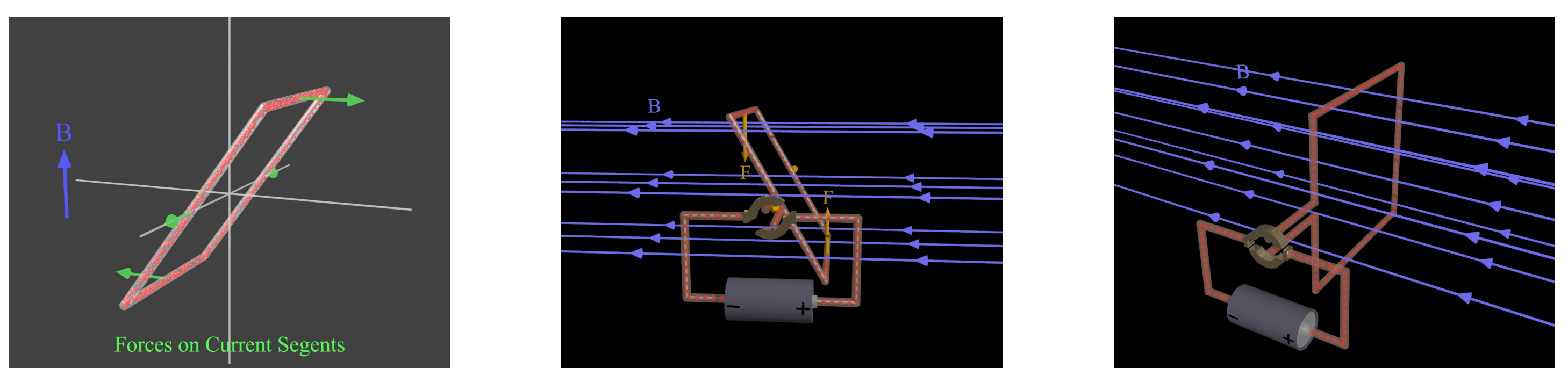


Motion in inertial versus non-inertial reference frames is illustrated in a series of merry-go-round animations and culminates in a depiction of the Coriolis effect on the earth.

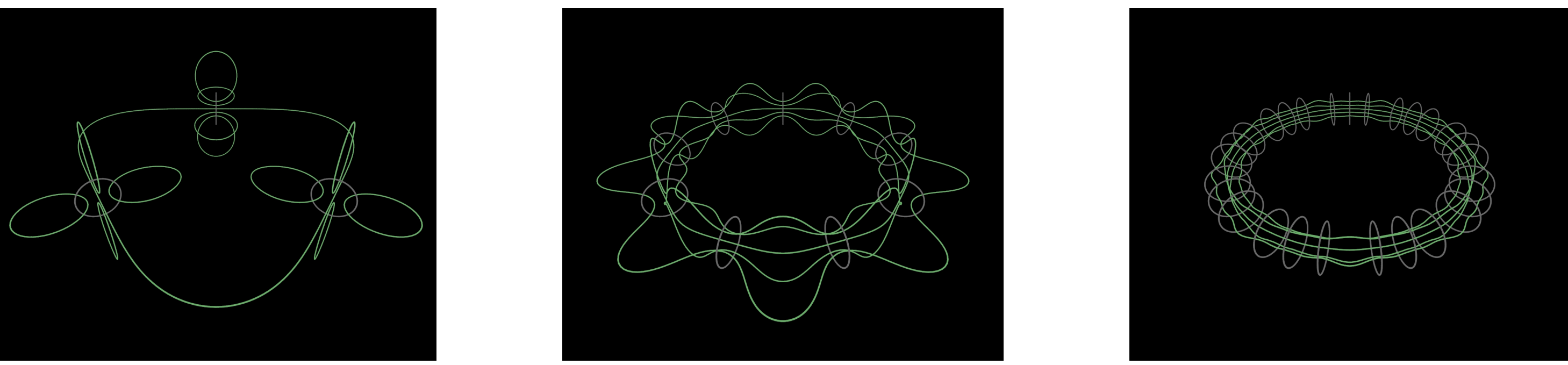


Cubic and Spherical 3-D Modes of Oscillation

New Animations: Electromagnetism

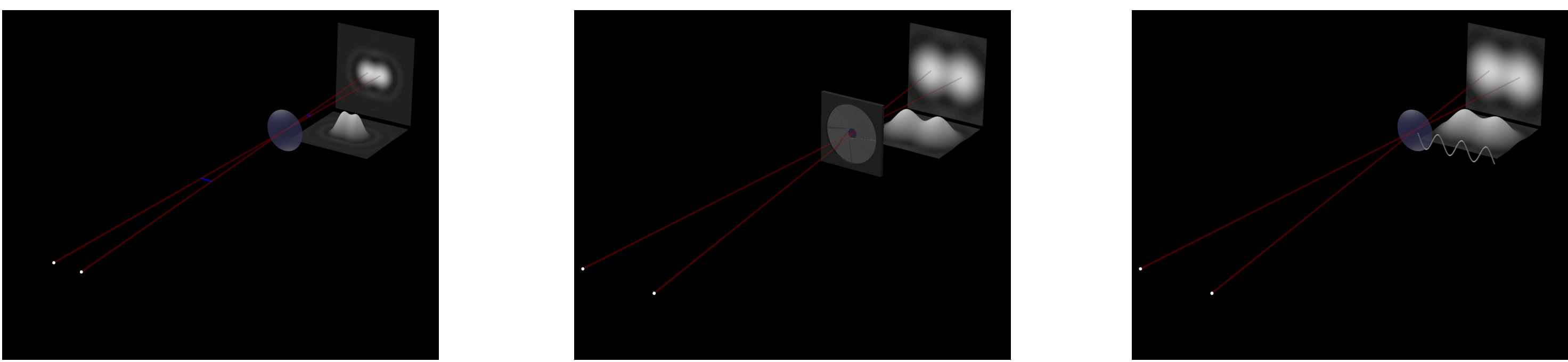


The forces on the current elements comprising a current loop are illustrated in the first animation, while the second expands on the concept showing a DC motor complete with commutator.



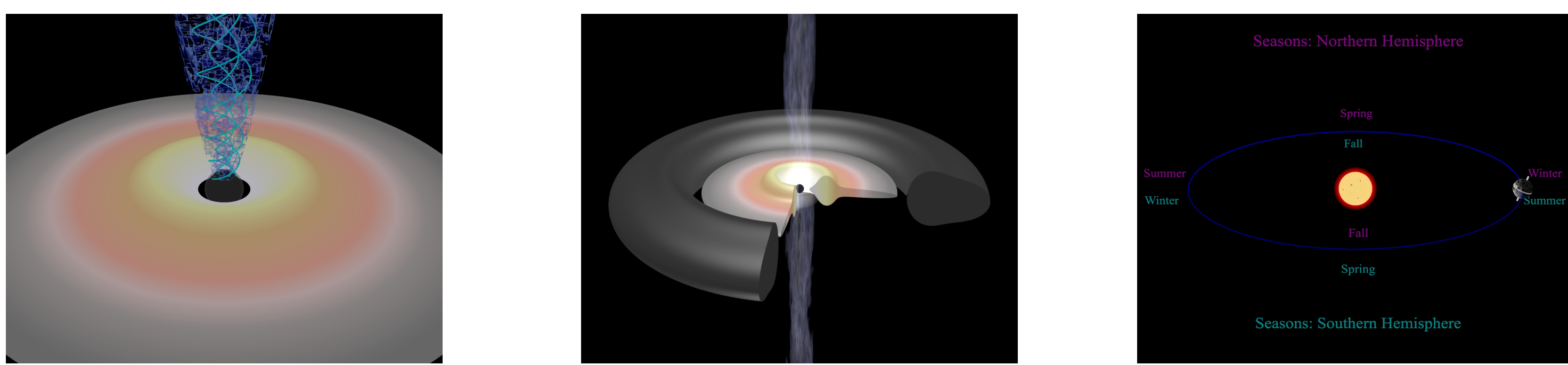
Progression From 3 Single Coils to a Toroidal Solenoid

New Animations: Optics

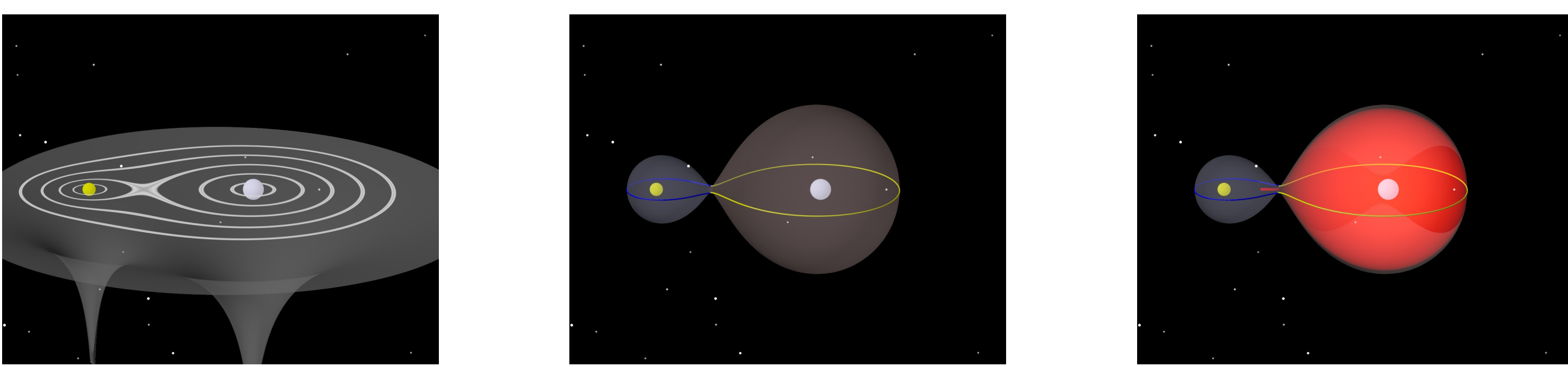


The first animation shows the diffraction limit on the resolution of two point sources. The second two animations show how the limiting diffraction effects depend upon aperture and wavelength.

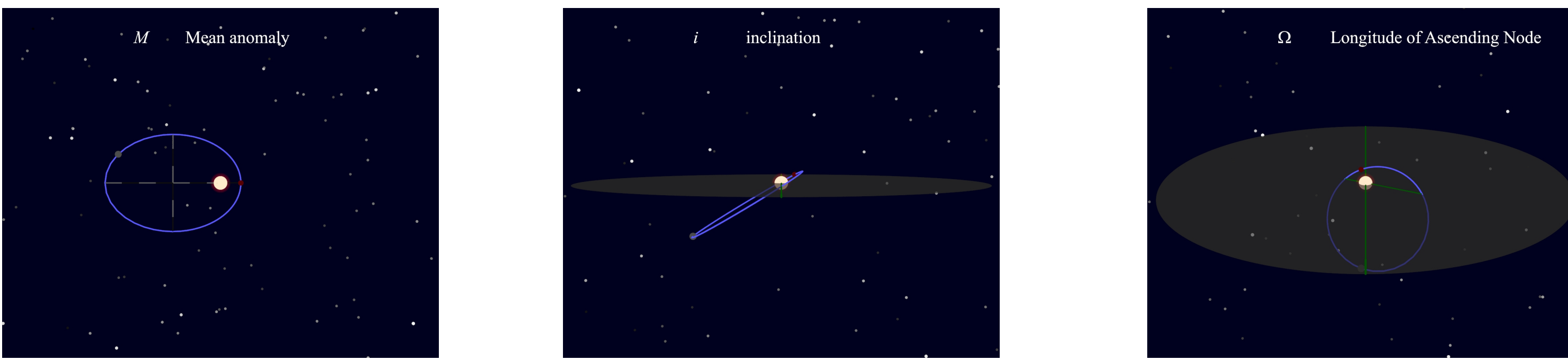
New Animations: Astronomy



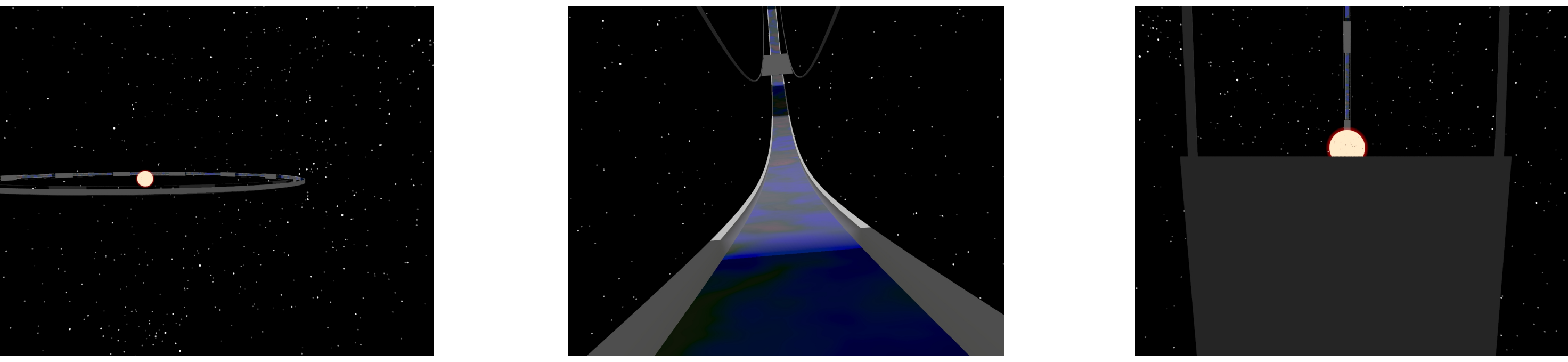
A hypothetical propulsion mechanism for radio galaxy jets is illustrated in the first animation, while the second focuses on the anatomy of an active galactic nuclei (accretion disk, dust torus, jet). The third animation is a simple illustration of the geometric cause of seasons on Earth.



These frames are from an animation depicting interacting binary stars, complete with Roche Lobes and mass transfer.

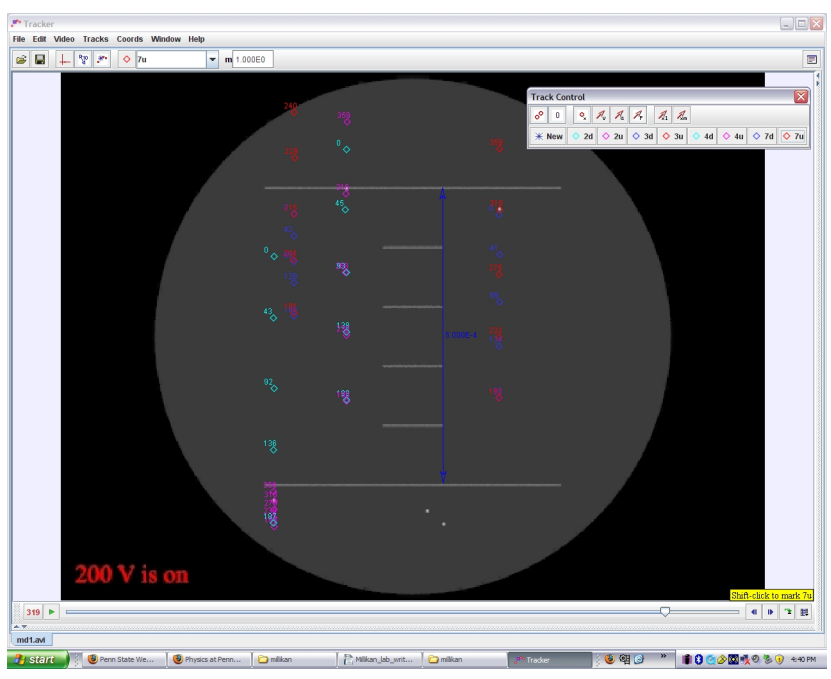


The Geometry of Orbital Elements

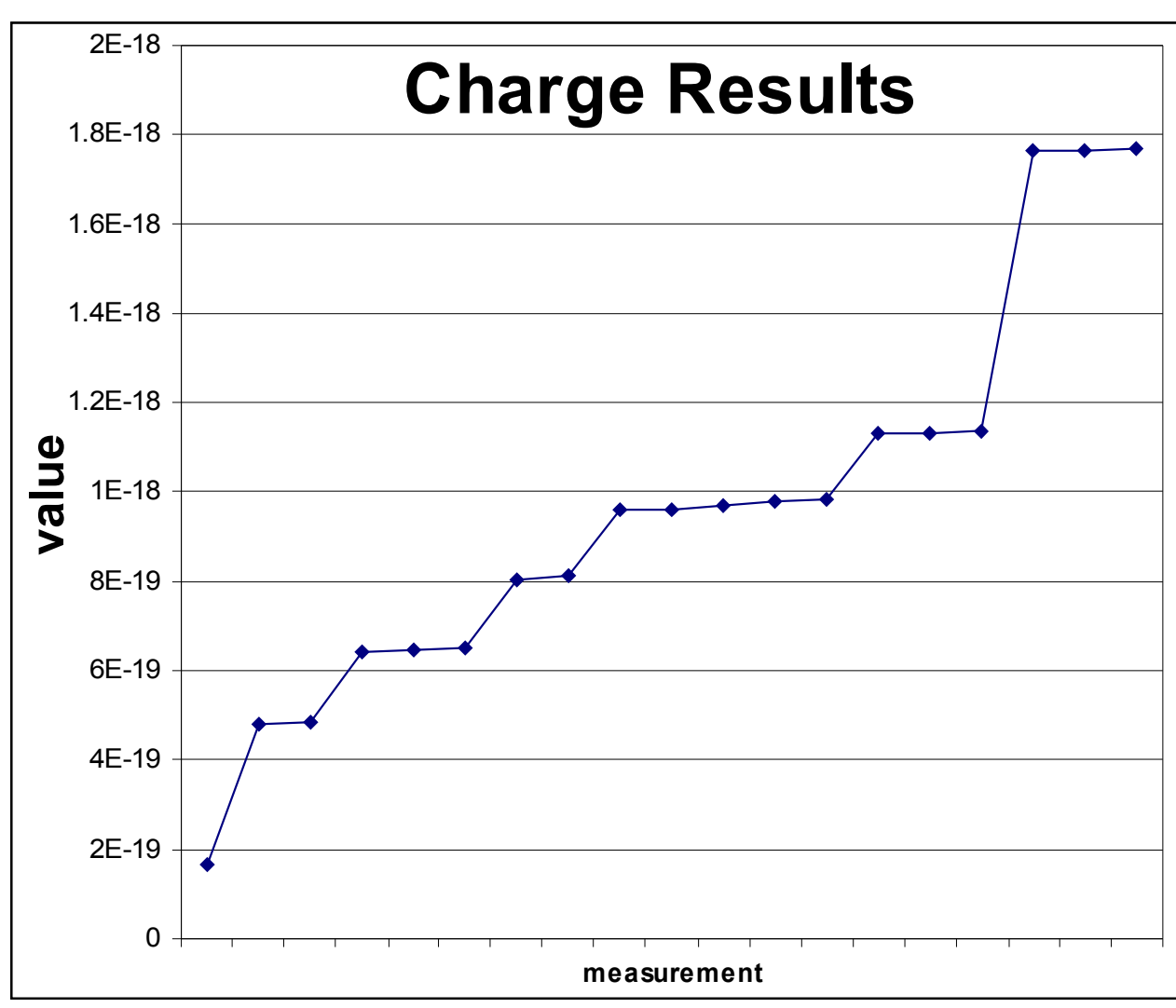


A Bit of Fantasy: a Ringworld Flyby

Artificial Video Data: The Millikan Oil Drop Experiment



Artificial video of oil drops analyzed with Doug Brown's *Tracker* applet



Sample data illustrating quantization of charge.

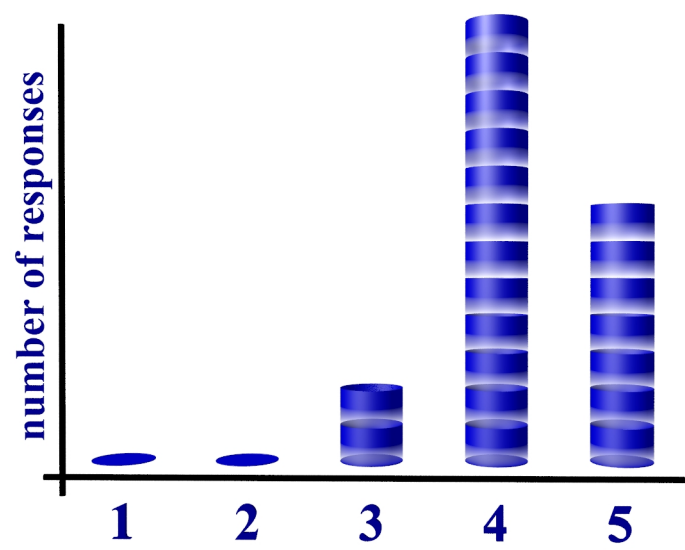
Assessment

Student Surveys from Conceptual Astronomy (Spring 07):

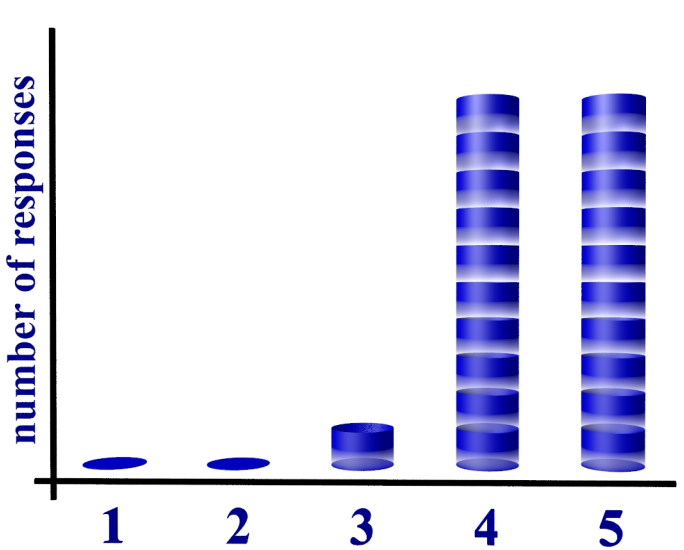
Indicate how strongly you agree or disagree with each of the following statements: Because of the way this course uses Multimedia Course Materials:

I am better able to understand the ideas and concepts taught in this course.

I am better able to visualize the ideas and concepts taught in this course.



1- No Basis for Judgment/ Not Applicable
2- Strongly Disagree
3- Disagree

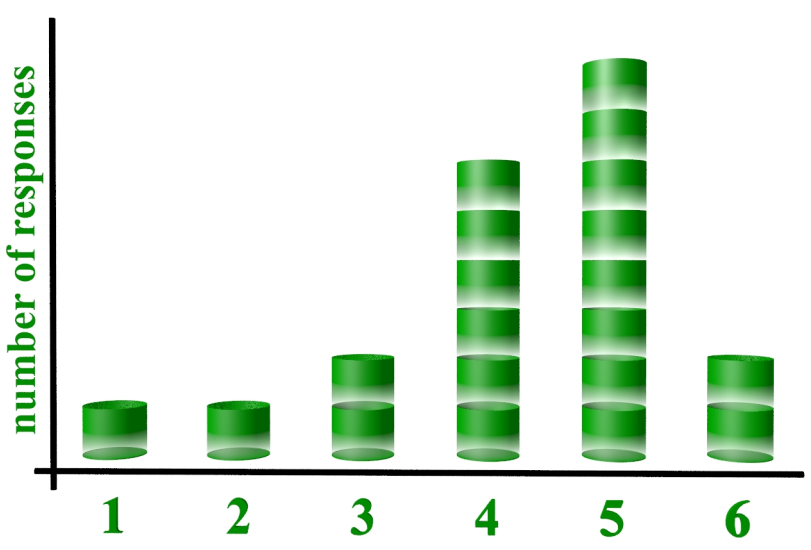


4- Agree
5- Strongly Agree

Think about a similar course you have taken that relied primarily on a simple lecture format. Compared with that course, because of the way this course uses Multimedia (computer-generated text, graphic, and/or video illustrations used to enhance a presentation or lecture): **how likely are [were] you to**

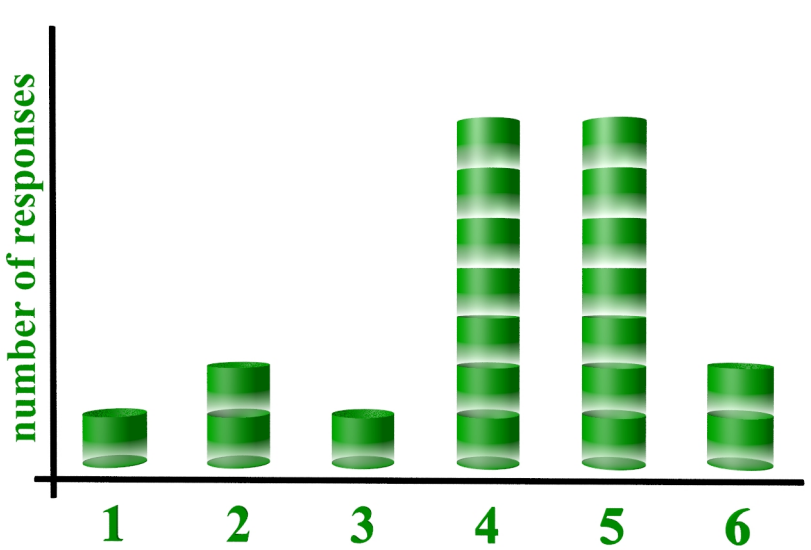
...discuss the ideas and concepts taught in this course with other students.

...enjoy the lectures for this course.

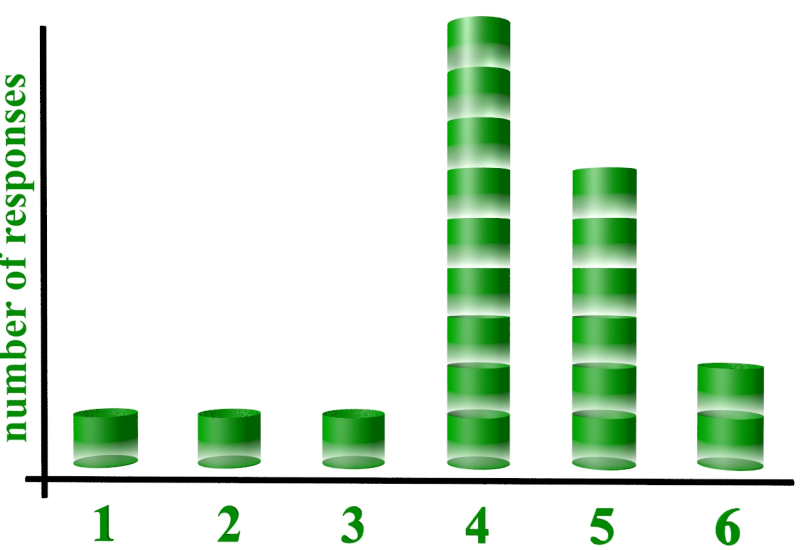


...discuss the ideas and concepts taught in this course with the instructor.

...apply what you are learning to "real world" problems.



1- No Basis for Judgment/ Not Applicable
2- Much Less Likely
3- Somewhat Less Likely Likely



4- About the Same
5- Somewhat More Likely
6- Much More Likely

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