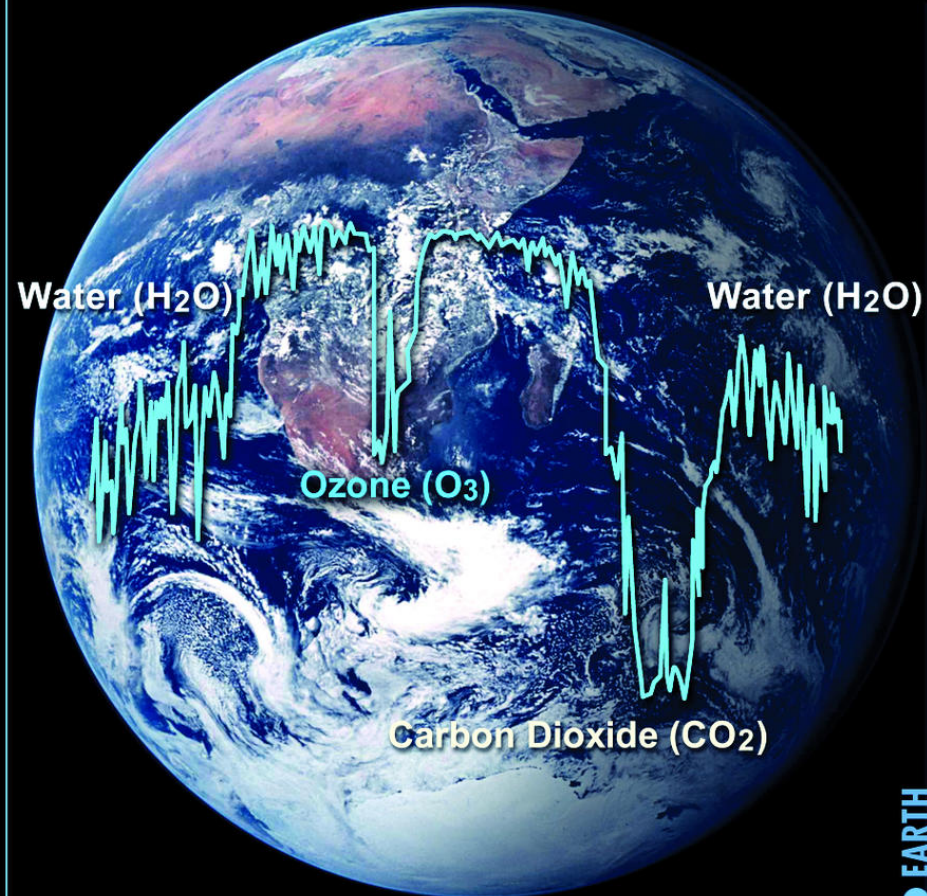
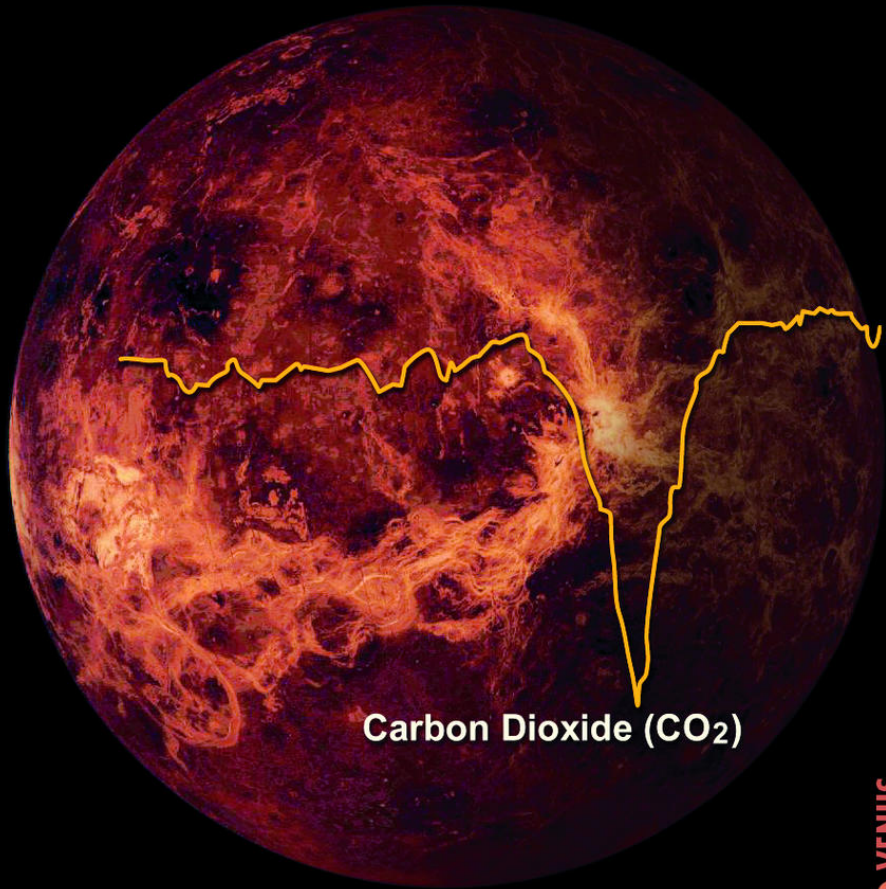


Planetary Habitability



Stephen Kane

Topics

- **Lecture 1 - Introduction**
- **Lecture 2 - Habitability Factors**
- **Lecture 3 - Planetary Atmospheres**
- **Lecture 4 - Planetary Interiors**
- **Lecture 5 - Planetary Energy Balance**
- **Lecture 6 - Habitable Zone I**
- **Lecture 7 - Habitable Zone II**
- **Lecture 8 - Earth as a Living Planet**
- **Lecture 9 - Mars**
- **Lecture 10 - Icy Moons**
- **Lecture 11 - Venus**
- **Lecture 12 - Mercury & the Moon**
- **Lecture 13 - The Role of Giant Planets**
- **Lecture 14 - Stellar Influences**
- **Lecture 15 - Magnetic Fields**
- **Lecture 16 - Milankovitch Cycles**
- **Lecture 17 - Geological Cycles**
- **Lecture 18 - Biosignatures**
- **Lecture 19 - Summary/Discussion**
- **Lecture 20 - Final Exam**

HOW TO CHARACTERIZE THE ATMOSPHERE OF A TRANSITING EXOPLANET

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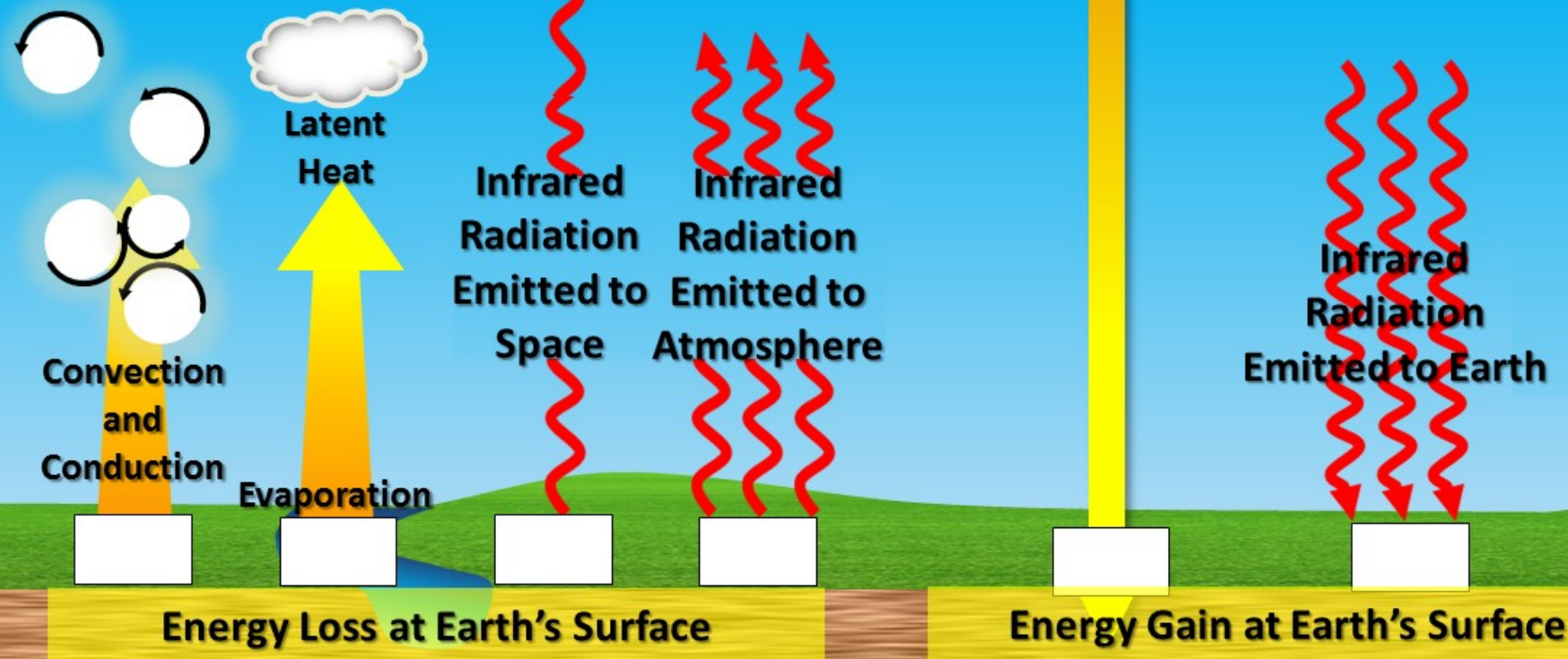
⁵NASA Earth and Space Sciences Graduate Fellow

ABSTRACT

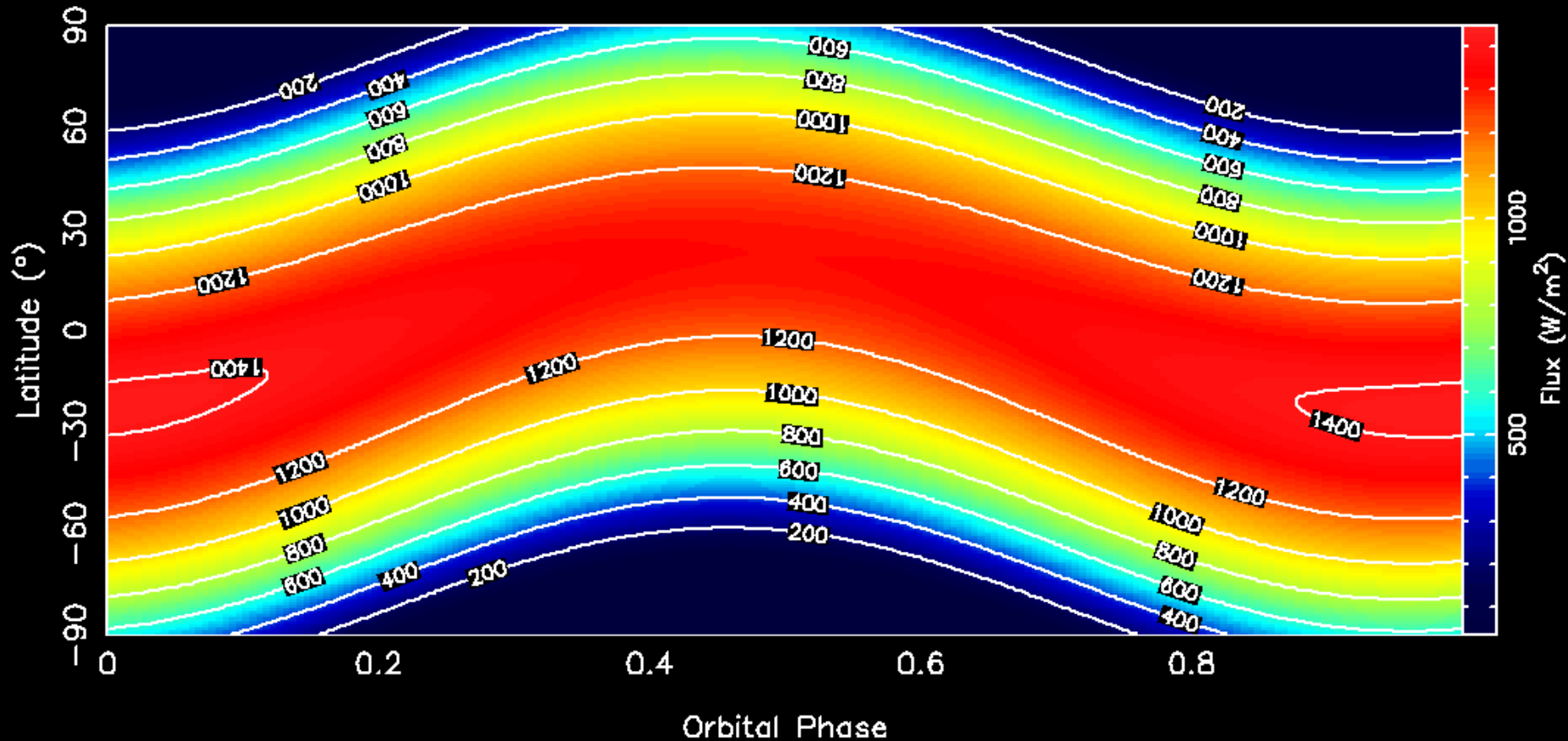
This tutorial is an introduction to techniques used to characterize the atmospheres of transiting exoplanets. We intend it to be a useful guide for the undergraduate, graduate student, or postdoctoral scholar who wants to begin research in this field, but who has no prior experience with transiting exoplanets. We begin with a discussion of the properties of exoplanetary systems that allow us to measure exoplanetary spectra, and the principles that underlie transit techniques. Subsequently, we discuss the most favorable wavelengths for observing, and explain the specific techniques of secondary eclipses and eclipse mapping, phase curves, transit spectroscopy, and convolution with spectral templates. Our discussion includes factors that affect the data acquisition, and also a separate discussion of how the results are interpreted. Other important topics that we cover include statistical methods to characterize atmospheres such as stacking, and the effects of stellar activity. We conclude by projecting the future utility of large-aperture observatories such as the James Webb Space Telescope and the forthcoming generation of extremely large ground-based telescopes.

Keywords:

RADIATION BALANCE AT EARTH'S SURFACE



Obliquity and Eccentricity



Obliquity and Eccentricity

