



Planetary Ring Systems

- Proposal reviewed and approved by CUP, contract offered
- Subtitle needed! Suggestions welcome!
- Definitive scholarly book, aiming to succeed the classic book edited by Greenberg and Brahic (1984)
- Scope includes all rings systems, not just Saturn
 - Most chapters to focus on ring types or characteristics in a way that cuts across the known ring-bearing planet systems
 - Example of approach: Tiscareno (2013, arXiv:1112.3305)
- Time frame
 - Finalize chapter titles and authors in Fall 2014
 - Rough drafts due Summer 2015
 - Aim for final drafts by end of 2015, publish book in 2016
 - Tentative plan: 2nd edition ~2020
- 650 pp, B/W figures in the text w/color plates in the back
- We will push for a strong multi-media component

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Draft Table of Contents

- Date: 13 August 2014
- For more info, or to volunteer, see Matt Tiscareno

Part I: Introductory Material

- **The History of Planetary Rings Science:** A historical overview of rings science, from the first discovery of Saturn's rings by Galileo in 1610 through the explosion of understanding due to Voyager to present investigations by Cassini, the Hubble Space Telescope, computer simulations, and more
- **The Orbital Dynamics of Rings:** A brief introduction to orbital elements (both osculating and epicyclic), the Roche criterion, optical depth, and other basic concepts that will be used frequently throughout the following chapters
- **Methods for Studying Rings:** Imaging, occultations, spectroscopy, etc.

Part II: Ring Systems by Location

- **The Rings of Saturn**
- **The Rings of Uranus**
- **The Rings of Neptune**
- **The Rings of Jupiter**
- **Ring Systems Beyond the Giant Planets:** The Rings of Chariklo; Locations where rings have been theorized but not yet clearly observed, including Mars, Pluto, Rhea, Iapetus, and exoplanets

Part III: Characteristics of Ring Systems

- **Self-Produced Structure in Dense Rings:** Self-gravity wakes, Viscous overstability, etc.
- **Externally Produced Structure in Dense Rings:** Propellers, Moonlet wakes, Spiral waves, Azimuthal structure in edges and ringlets, etc.
- **Unexplained Structure in Dense Rings:** C ring plateaux, B ring structure, Cassini Division gaps
- **Sharp Edges in Rings**
- **Narrow Rings**
- **The Dynamics of Dusty Rings**
- **Electromagnetic, Plasma, and Atmospheric Interactions with Rings**
- **Arcs and Other Azimuthal Structure in Rings**
- **Rings as Detectors:** Spokes and resonant structures in dust and other effects of planetary electromagnetism, Impact-generated features, Planetary gravity via narrow ring precession, etc.
- **Composition, Particle Properties, and Thermal Properties of Saturn's Rings**
- **Computer Simulations of Rings**
- **Laboratory Studies of Rings:** Ground-truth spectroscopy, coefficient of restitution
- **The Age and Origins of Ring Systems**
- **Rings and Other Disks:** The interplay between the study of planetary rings and the study of circumstellar disks and solar system origins
- **The Future of Planetary Rings Studies**

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- Please volunteer to write or co-write a chapter!
- If you have suggestions to change the Table of Contents, please share them!
- Please talk to Matt during the meeting with any questions or comments
- Email editors
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