

**EDUCATION**

2006, Physics (Astrophysics), University of California, Santa Cruz (Highest Honors)

2008, M.S., Astronomy, University of Hawaii at Manoa

2011, Ph.D., Astronomy, University of Hawaii at Manoa (Advisor: Ilia I. Roussev)

**EXPERIENCE**

Cooper Downs is an astrophysicist whose research focuses on understanding thermodynamic and magnetic processes in the solar corona. His research interests include massively parallel numerical modeling of astrophysical plasmas, improving 3D visualization techniques, and developing new methods for observational data analysis. He is particularly interested in the improvement and validation of numerical models through direct comparisons to observational data, and has used this approach to contribute to our understanding of large scale waves in the solar corona. Most recently he has studied the influence of the coronal magnetic field on the tail evolution of sun-grazing comet C/2011 W3 (Lovejoy). Cooper Downs completed his Ph.D. in 2011 under Dr. Ilia Roussev at the University of Hawaii. His dissertation work was primarily supported by a NASA Earth and Space Science Fellowship award.

**HONORS AND AWARDS**

- NASA Earth and Space Science Fellowship in Heliophysics, **2008 - 2011**.
- Outstanding Student Paper Award, Fall Meeting of the American Geophysical Union, **2010**.

**PROFESSIONAL AFFILIATIONS**

- Reviewer for The Astrophysical Journal, **2011 - Present**.
- Member, American Geophysical Union, **2009 - Present**.
- Member, American Astronomical Society, **2012 - Present**.

**SELECTED PUBLICATIONS**

- **C. Downs**, J. A. Linker, Z. Mikić, P. Riley, C. J. Schrijver, P. Saint-Hilaire, **2013**, “Probing the Solar Magnetic Field With a Sun-Grazing Comet”, *Science*, 340, 6137, 1196-1199, doi:10.1126/science.1236550
- **C. Downs**, I. I. Roussev, B. van der Holst, N. Lugaz, & I. V. Sokolov, **2012**, “Understanding SDO/AIA Observations of the 2010 June 13 EUV Wave Event: Direct Insight from a Global Thermodynamic MHD Simulation”, *The Astrophysical Journal*, 750, 134.
- **C. Downs**, I. I. Roussev, B. van der Holst, N. Lugaz, I. V. Sokolov, & T. I. Gombosi, **2011**, “Studying EUV Wave Transients with a Digital Laboratory: Direct Comparison of EUV Wave Observations to Global Magneto-hydrodynamic Simulations”, *The Astrophysical Journal*, 728, 2.
- **C. Downs**, I. I. Roussev, B. van der Holst, N. Lugaz, I. V. Sokolov, & T. I. Gombosi, **2010**, “Toward a Realistic Thermodynamic Magneto-hydrodynamic Model of the Global Solar Corona”, *The Astrophysical Journal*, 712, 1219.
- C. J. Schrijver, C. Lisse, & **C. Downs**, “Comets as Solar Probes”, *Physics Today*, 66, 8, 27
- I. V. Sokolov, B. van der Holst, R. Oran, **C. Downs**, I. I. Roussev, M. Jin, W. B. Manchester, R. M. Evans, & T. I. Gombosi, **2013**, “Magneto-hydrodynamic Waves and Coronal Heating: Unifying Empirical and MHD Turbulence Models”, *The Astrophysical Journal*, 764, 23
- C. Garraffo, O. Cohen, J. J. Drake, & **C. Downs**, **2013**, “The Effect of Limited Spatial Resolution of Stellar Surface Magnetic Field Maps on Magneto-hydrodynamic Wind and Coronal X-Ray Emission Models”, *The Astrophysical Journal*, 764, 32
- I. I. Roussev, K. Galsgaard, **C. Downs**, N. Lugaz, I. V. Sokolov, E. Moise, & J. Lin, **2012**, “Explaining fast ejections of plasma and exotic X-ray emission from the solar corona”, *Nature Physics*, doi:10.1038/nphys2427
- N. Lugaz, **C. Downs**, K. Shibata, I. I. Roussev, I. I., A. Asai, & T. I. Gombosi, **2011**, “Numerical Investigation of a Coronal Mass Ejection from an Anemone Active Region: Reconnection and Deflection of the 2005 August 22 Eruption”, *Astrophysical Journal*, 738, 127