

## JEFFREY PAUL MORGENTHALER

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### Education:

Summer 1998	Ph.D., Physics, University of Wisconsin, Madison
December 1994	M.S., Physics, University of Wisconsin, Madison
Spring 1990	B.S., Physics, Massachusetts Institute of Technology

### Positions:

2009–present	Senior Scientist
2008–2009	Research Scientist – Planetary Science Institute (PSI)
2004–2007	Research Scientist–University of Washington, Seattle (Harris)
2002–2004	National Research Council Fellow–NASA Goddard Space Flight Center (Oliversen)
2001–2002	Assistant Scientist, University of Wisconsin–Madison
Spring 2000	Lecturer, Department of Astronomy, University of Wisconsin–Madison
1998–2001	Research Associate, University of Wisconsin–Madison (Scherb/Roesler/Harris)
1998–2001	Research Associate, University of Wisconsin–Madison (Scherb/Roesler/Harris)
1995–1998	Ph.D. Thesis Student, University of Wisconsin–Madison (McCammon/Sanders)
1991–1995	Graduate Research Assistant, University of Wisconsin–Madison (McCammon)
1990–1991	Teaching Assistant, University of Wisconsin–Madison Physics Department

### Research:

- 2017– Director of the PSI Observatory, a small-aperture robotic coronagraph which studies Jupiter’s magnetospheric response to changes in Io’s volcanic output, Mercury’s sodium tail, comets, asteroids, and extrasolar planets
- 2005– Principal Investigator on 11 NASA and NSF grants totalling over \$2.5M
- 1992– Create software for astronomical instrument control and data analysis  
<https://github.com/jpmorgen>
- 1992– Create novel instrumentation for the study of astronomical objects
- 1989– Logged over 1000 nights of observing time on a variety of ground-based telescopes

### Press Releases:

- Evidence for volcanic eruption on Jupiter’s moon Io  
<http://www.psi.edu/news/iosodium>
- Observation of Mercury’s sodium tail  
<http://www.psi.edu/news/cover-pages/2018/mercurys-sodium-tail>

- Comet NEOWISE sodium tail  
<https://psi.edu/news/neowisesodiumtail>

### Teaching/Mentoring:

- NASA and NSF proposal writing/general writing skills
- Scientific programming and data analysis
- Laboratory techniques
- *Space and Space Travel* (enrollment, 150 undergraduates). Responsible for lecture content, homework assignments, two quizzes, and oversight of 3 TAs
- *Our Exploration of the Solar System*. Responsible for syllabus, lectures, web-based lecture notes (<http://wisp.physics.wisc.edu/astro104>), homework, exams, projects, honors section, and oversight of one TA (Text: *Universe*, Kaufmann & Freedman, 5th ed)
- *Introductory Physics for Engineers*. Responsible for running discussion 2 sections and labs per semester, grading homework, labs and exams

### References:

Prof. Nicholas Schneider	Nick.Schneider@lasp.colorado.edu	303-735-2355
LASP, U. Colorado Boulder, 1234 Innovation Drive, Boulder, CO 80303		
Dr. Thomas H. Prettyman	prettyman@psi.edu	505-221-5939
Planetary Sciences Institute, 6509 Caballero Pkwy NW, Los Ranchos de Albuquerque, NM 87107		
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Planetary Sciences Institute, 1700 East Fort Lowell, Suite 106, Tucson, AZ, 85719		
Dr. Rosaly M. Lopes	rosaly.m.lopes-gautier@jpl.nasa.gov	818-393-4584
Jet Propulsion Laboratory, MS 183-601, 4800 Oak Grove Drive, Pasadena, CA 91109		
Prof. Walter Harris	wharris@lpl.arizona.edu	520-621-6971
Lunar and Planetary Laboratory, University of Arizona, 1629 E University Blvd Tucson, AZ 85721		

### Honors and Awards:

2003	NASA Astrobiology Institute Insight Course: Intro. to the Microbial World
1996	Goddard Space Flight Center Group Award (X-ray Quantum Calorimeter)
1993	Department of Education Fellowship
1989	Sigma Pi Sigma Physics Honor Society

### Professional Society Memberships:

American Astronomical Society (AAS), AAS Division of Planetary Sciences (AAS/DPS), AAS

High Energy Astrophysics Division (AAS/HEAD), American Geophysical Union (AGU), American Association for the Advancement of Science (AAAS)

### Community Service/Outreach:

- 2008–present Numerous NASA R&A, spacecraft, Planetary Data System (PDS) review panels and journal article reviews
- Dec 2021 Maine School of Science and Mathematics Astronomy Club Guest Lecture: “Why Comet Leonard is so cool”
- Dec 2017 Maine School of Science and Mathematics Astronomy Club Guest Lecture: “What is it like to be an astronomer?”
- Jan 2015 Big Bear Valley Astronomical Society Virtual Lecture Series lecture: “Io and the Plasma Torus: Observing Projects Accessible to Amateur Astronomers”
- Winter 2014 Maine School of Science and Mathematics Astronomy Club Guest Lecture: “Comet ISON observing report: Sungrazing comet catalog project”
- Fall 2013 Maine School of Science and Mathematics Astronomy Club Guest Lecture: “What Astrophysics Means to Me”
- Fall 2012 University of Maine Fort Kent General Science Guest Lecture: “The Night Sky: What it has Taught Us”
- Spring 2009 High School Classroom Presentation: “Crater counting: All I needed to know to be a scientist I learned in Kindergarten”
- Fall 2005 City of Edmonds *Family Science Night*: dry ice comet and other demonstrations
- Spring 2003 Co-presenter: *Astronomy, Science, and Faith*, an 8-week course exploring the relationships between faith and science
- 1997–present Friendly Observer: answer tourists’ questions at the McMath-Pierce Solar Telescope Facility at the Kitt Peak National Observatory
- Summer 1996 Nehemiah Project Elementary School Reading Tutor (Faith-Based Community Development Project for African-Americans in Madison Wisconsin)
- 1991–1995 UW–Madison *Wonders of Physics* Laboratory demonstrations in Space Physics

### Publications:

Grava, C., Cassidy, T. A., Schneider, N. M., Hsu, H.-W., **Morgenthaler, J. P.**, Leblanc, F., Mangano, V., Retherford, K. D., Burger, M. H., & Barbieri, C., *A Possible Dust Origin for an Unusual Feature in Io’s Sodium Neutral Clouds*. 2021, *AJ*, 162, 190, doi: 10.3847/1538-3881/ac1ff8

**Morgenthaler, J. P.**, Rathbun, J. A., Schmidt, C. A., Baumgardner, J., & Schneider, N. M., *Large Volcanic Event on Io Inferred from Jovian Sodium Nebula Brightening*. 2019, *Astrophys. J., Lett.*, 871, L23, doi: 10.3847/2041-8213/aafdb7

Schmidt, C., Schneider, N., Leblanc, F., Gray, C., **Morgenthaler, J.**, Turner, J., & Grava, C., *A Survey of Visible S<sup>+</sup> Emission in Io’s Plasma Torus During the Hisaki Epoch*. 2018, *JGR: Space Physics*, 123, 5610, doi: 10.1029/2018JA025296

McKay, A. J., Cochran, A. L., DiSanti, M. A., Villanueva, G., Dello Russo, N., Vervack, R. J., **Morgenthaler, J. P.**, Harris, W. M., & Chanover, N. J., *Evolution of H<sub>2</sub>O, CO, and CO<sub>2</sub> pro-*

- duction in Comet C/2009 P1 Garradd during the 2011-2012 apparition*. 2015, *Icarus*, 250, 504, doi: 10.1016/j.icarus.2014.12.023
- McKay, A. J., Chanover, N. J., DiSanti, M. A., **Morgenthaler, J. P.**, Cochran, A. L., Harris, W. M., & Dello Russo, N., *Rotational variation of daughter species production rates in Comet 103P/Hartley: Implications for the progeny of daughter species and the degree of chemical heterogeneity*. 2014, *Icarus*, 231, 193, doi: 10.1016/j.icarus.2013.11.029
- Grava, C., Schneider, N. M., Leblanc, F., **Morgenthaler, J. P.**, Mangano, V., & Barbieri, C., *Solar control of sodium escape from Io*. 2014, *Journal of Geophysical Research (Planets)*, 119, 404, doi: 10.1002/2013JE004504
- McKay, A. J., Chanover, N. J., **Morgenthaler, J. P.**, Cochran, A. L., Harris, W. M., & Dello Russo, N., *Observations of the forbidden oxygen lines in DIXI target Comet 103P/Hartley*. 2013, *Icarus*, 222, 684, doi: 10.1016/j.icarus.2012.06.020
- McKay, A., Chanover, N., **Morgenthaler, J. P.**, Cochran, A., Harris, W. M., & Dello Russo, N., *Forbidden Oxygen Lines in Comets C/2006 W3 Christensen and C/2007 Q3 Siding Spring at Large Heliocentric Distance: Implications for the Sublimation of Volatile Ices*. 2012, *Icarus*, 220, 277, doi: 10.1016/j.icarus.2012.04.030
- Morgenthaler, J. P.**, Harris, W. M., Combi, M. R., Feldman, P. D., & Weaver, H. A., *GALEX FUV Observations of Comet C/2004 Q2 (Machholz): The Ionization Lifetime of Carbon*. 2011, *Astrophys. J.*, 726, 8, doi: 10.1088/0004-637X/726/1/8
- Prettyman, T. H., Feldman, W. C., McSween, H. Y., Dingler, R. D., Enemark, D. C., Patrick, D. E., Storms, S. A., Hendricks, J. S., **Morgenthaler, J. P.**, Pitman, K. M., & Reedy, R. C., *Dawn's Gamma Ray and Neutron Detector*. 2011, *Space Sci. Rev.*, 334, doi: 10.1007/s11214-011-9862-0
- Feldman, P. D., McCandliss, S. R., **Morgenthaler, J. P.**, Lisse, C. M., Weaver, H. A., & A'Hearn, M. F., *Galaxy Evolution Explorer Observations of CS and OH Emission in Comet 9P/Tempel 1 During Deep Impact*. 2010, *Astrophys. J.*, 711, 1051, doi: 10.1088/0004-637X/711/2/1051
- Edgar, R. J., Sanders, W. T., Smith, R. K., & **Morgenthaler, J. P.** 2009, in *American Institute of Physics Conference Series*, ed. R. K. Smith, S. L. Snowden, & K. D. Kuntz, Vol. 1156, 24–28
- Morgenthaler, J. P.**, Harris, W. M., & Combi, M. R., *Large Aperture [O I] 6300 Å Observations of Comet Hyakutake: Implications for the Photochemistry of OH and [O I] Production in Comet Hale-Bopp*. 2007, *Astrophys. J.*, 657, 1162, doi: 10.1086/511062
- Glinski, R. J., Ford, B. J., Harris, W. M., Anderson, C. M., & **Morgenthaler, J. P.**, *Oxygen/Hydrogen Chemistry in the Inner Comae of Active Comets*. 2004, *Astrophys. J.*, 608, 601
- Morgenthaler, J. P.**, Harris, W. M., Scherb, F., Roelser, F. L., Anderson, C. M., Doane, N. E., & Oliverson, R. J., *The Gas Production Rate and Coma Structure of Comet C/1995 O1 (Hale-Bopp)*. 2002a, *Earth, Moon, Planets*, 90, 77, doi: 10.1023/A:1021564301815

- Morgenthaler, J. P.**, Harris, W. M., Scherb, F., Doane, N. E., & Oliverson, R. J., *Velocity-Resolved Observations of H $\alpha$  Emission from Comet C/1995 O1 (Hale-Bopp)*. 2002b, *Earth, Moon, Planets*, 90, 89, doi: 10.1023/A:1021516418653
- Harris, W. M., **Morgenthaler, J. P.**, Scherb, F., Anderson, C., & Oliverson, R. J., *Wide Field Imaging and the Velocity Structure in the Coma of Hale-Bopp*. 2002, *Earth, Moon, Planets*, 90, 45, doi: 10.1023/A:1021556132765
- Oliverson, R. J., Doane, N. E., Scherb, F., Harris, W. M., & **Morgenthaler, J. P.**, *Measurements of [C I] Emission from Comet Hale-Bopp*. 2002, *Astrophys. J.*, 581, 770, doi: 10.1086/344149
- Harris, W. M., Scherb, F., Mierkiewicz, E. J., Oliverson, R. J., & **Morgenthaler, J. P.**, *Production, Outflow Velocity, and Radial Distribution of H<sub>2</sub>O and OH in the Coma of Comet C/1995 O1 (Hale-Bopp)*. 2002, *Astrophys. J.*, 578, 996, doi: 10.1086/342648
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- Morgenthaler, J. P.**, Harris, W. M., Scherb, F., Anderson, C. M., Oliverson, R. J., Doane, N. E., Combi, M. R., Marconi, M. L., & Smyth, W. H., *Large Aperture [O I] 6300 Å Photometry of Comet Hale-Bopp: Implications for the Photochemistry of OH*. 2001, *Astrophys. J.*, 563, 451, doi: 10.1086/323773
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McCammon, D., Cui, W., Juda, M., **Morgenthaler, J. P.**, Zhang, J., Kelley, R. L., Holt, S. S., Madejski, G. M., Moseley, S. H., & Szymkowiak, A. E., *Thermal Calorimeters for High Resolution X-ray Spectroscopy*. 1993, Nucl. Instrum. Methods Phys. Res., Sect. A, 326, 157

Juda, M., Cui, W., McCammon, D., **Morgenthaler, J. P.**, Sanders, W. T., Zhang, J., Kelley, R. L., Madejski, G., Moseley, S. H., Stahle, C., & Szymkowiak, A. E., *Thermal Detectors for X-ray Astronomy: Current Performance and Limitations*. 1992, Proceedings of SPIE, 1743, 398

#### **Posters, presentations, and abstracts (unrefereed work):**

**Morgenthaler, J. P.**, Schmidt, C. A., Vogt, M., & Schneider, N. M., *Using Io Input/Output observatory (IoIO) observations to provide an new approach to resolving the question: Is mass flow in Jupiter's magnetosphere driven by internal or external processes?* 2021, Magnetospheres of the Outer Planets Conference, PG5

**Morgenthaler, J.**, Bodewits, D., Vervack, R., & Harris, W. 2019a, in EPSC-DPS Joint Meeting 2019, Vol. 2019, EPSC–DPS2019–381

**Morgenthaler, J. P.**, Rathbun, J. A., Schmidt, C. A., Baumgardner, J., & Schneider, N. M., *The response of the S+ Io plasma torus to the large volcanic outburst in 2018*. 2019b, Magnetospheres of the Outer Planets Conference, P48

**Morgenthaler, J. P.**, *Observations of the Jovian sodium nebula and Io plasma torus with the Io Input/Output Facility (IoIO)*. 2018, Magnetospheres of the Outer Planets Conference, P45

Schmidt, C., Schneider, N. M., Leblanc, F., Gray, C., **Morgenthaler, J.**, Turner, J., & Grava, C., *Visible Wavelength Spectroscopy of the Io Torus During the Hisaki Mission*. 2018, Magnetospheres of the Outer Planets Conference, P49

**Morgenthaler, J. P.**, & Rathbun, J. A., *The Commissioning of the Io Input/Output Facility (IoIO), a robotic observatory for studying Jupiter's magnetospheric response to Io's volcanic activity*. 2017, Magnetospheres of the Outer Planets Conference, P19

**Morgenthaler, J. P.**, & Marconi, M., *What impedes radial transport of material in Jupiter's inner magnetosphere?* 2017, Magnetospheres of the Outer Planets Conference, P20

Magalhães Fabíola, P., Gonzalez, W., Echer, E., Souza-Echer, M. P., **Morgenthaler, J. P.**, & Lopes, R., *Image processing of ground based observations of [SII] emission lines from the Io plasma torus*. 2017, Magnetospheres of the Outer Planets Conference, P21

Schmidt, C., Schneider, N. M., Leblanc, F., Johnson, R. E., Gray, C., **Morgenthaler, J.**, Turner, J., & Grava, C., *Characterizing Io's Plasma Torus at Visible Wavelengths*. 2017, Magnetospheres of the Outer Planets Conference, TF:15:15

Magalhães Fabíola, P., Gonzalez, W., Echer, E., Souza-Echer, M. P., Lopes, R., **Morgenthaler, J. P.**, & Rathbun, J., *Ground-based observations of the [S II] 6731 Å emission lines of the Io plasma torus*. 2017, Living Around Active Stars, 328, 227, doi: 10.1017/S1743921317003738

- Morgenthaler, J. P.**, Marconi, M., Oliverson, R. J., & Woodward, R. C., J., *Radial transport from the Io plasma torus: driven from the inside out or outside in?* 2016, AGU Fall Meeting Abstracts, SM51E
- Morgenthaler, J. P.**, Marconi, M., Woodward, R. C., Thompson, M., & Oliverson, R. J., *Using Io as a plasma probe: Statistical comparison of the Oliverson et al. (2001) plasma torus model to the [O I] 6300 Å dataset.* 2015, Magnetospheres of the Outer Planets Conference, PII
- Magalhães, F. P., Lopes, R. M. C., Rathbun, J. A., Gonzalez, W. D., **Morgenthaler, J. P.**, Echer, E., & Echer, M. P. D. S., *Connecting Io's volcanic activity to the Io plasma torus: comparison of Galileo/NIMS volcanic and ground-based torus observations.* 2015, AGU Fall Meeting Abstracts, P31B
- Morgenthaler, J. P.**, Marconi, M. L., Oliverson, R. J., & Woodward, R. C., *The Io Plasma Torus: Motivation for Abandoning the "Active Sector" Concept in Favor of System IV Modulation: Support from Small-Scale Variation?* 2014, AGU Fall Meeting Abstracts, P21A
- Pinho Magalhães, F., Echer, E., Gonzalez Alarcon, W. D., Lopes, R., **Morgenthaler, J.**, & Echer, M. P. S. 2014, in COSPAR Meeting, Vol. 40, 40th COSPAR Scientific Assembly. Held 2-10 August 2014, in Moscow, Russia, Abstract B0.3-14-14., 2548
- Morgenthaler, J. P.**, Oliverson, R. J., Marconi, M. L., Woodward, R. C., & Peterson, C., *Short Term Variation in Oxygen Emission from Io: The Distribution of Positive and Negative "Departure Events".* 2013, Magnetospheres of the Outer Planets Conference, P8
- Wooden, D. H., Woodward, C. E., Harker, D. E., Kelley, M. S., Sitko, M., Reach, W. T., De Pater, I., Gehrz, R. D., Kolokolova, L., Cochran, A. L., McKay, A. J., Reardon, K., Cauzzi, G., Tozzi, G., Christian, D. J., Jess, D. B., Mathioudakis, M., Lisse, C. M., **Morgenthaler, J. P.**, & Knight, M. M., *Comet C/2012 S1 (ISON): Observations of the Dust Grains from SOFIA and of the Atomic Gas from NSO Dunn and McMath-Pierce Solar Telescopes (Invited).* 2013, AGU Fall Meeting Abstracts, A7
- McKay, A., Chanover, N., DiSanti, M., **Morgenthaler, J. P.**, Villanueva, G., Cochran, A., Harris, W., Dello Russo, N., & Vervack, R. J., *The Origin of Daughter Species in Cometary Comae: Results from Observations of Comets 103P/Hartley and C/2009 P1 Garradd.* 2013, Bull. Am. Astron. Soc., 45
- Morgenthaler, J. P.**, Marconi, M. L., Oliverson, R. J., Peterson, C. A., & Woodward, R. C., *Short Term Variation in Oxygen Emission from Io: A First Census of "Departure Events".* 2012, AGU Fall Meeting Abstracts, SM51A
- Schneider, N. M., Grava, C., Horányi, M., Barbieri, C., Leblanc, F., Mangano, V., & **Morgenthaler, J. P.**, *A Dusty Origin of Io's Escaping Sodium?* 2012, AGU Fall Meeting Abstracts, P34C
- Grava, C., Schneider, N., **Morgenthaler, J.**, Leblanc, F., Mangano, V., Barbieri, C., & Retherford, K., *Post-eclipse Behavior Of Io's Atmosphere.* 2012, Bull. Am. Astron. Soc., 44

- McKay, A., Chanover, N., DiSanti, M., **Morgenthaler, J. P.**, Cochran, A., Harris, W., Dello Russo, N., & Vervack, Jr., R. J., *Infrared and Optical Spectroscopy of Comet C/2009 P1 Garradd: CO Abundance and Implications for the Atomic Oxygen Yield from CO Photodissociation*. 2012, Bull. Am. Astron. Soc., 44
- Harris, W. M., **Morgenthaler, J. P.**, & Vervack, R. J., *Production Rate and Spatial Distribution of Carbon in the Coma of C/1995O1 (Hale-Bopp): Implications for the Neutral Carbon Lifetime and Coma Velocity Structure*. 2012, LPI Contributions, 1667, 6479
- McKay, A. J., Chanover, N. J., DiSanti, M. A., **Morgenthaler, J. P.**, Cochran, A. L., Harris, W. M., & Dello Russo, N., *Using Atomic Oxygen as a Proxy for CO<sub>2</sub> Production in Comets: Application to Comets 103P/Hartley and C/2009 P1 Garradd*. 2012, LPI Contributions, 1667, 6212
- Morgenthaler, J. P.**, Harris, W. M., Combi, M. R., Feldman, P. D., & Weaver, H. A. 2011, in EPSC-DPS 2011 Joint Meeting Abstracts, 1254
- McKay, A., Chanover, N., Dello Russo, N., Harris, W., Cochran, A., & **Morgenthaler, J. P.** 2011, in EPSC-DPS 2011 Joint Meeting Abstracts, 651
- Morgenthaler, J. P.**, Edgar, R. J., Sanders, W. T., Smith, R. K., Koutroumpa, D., Henley, D. B., Shelton, R. L., Robertson, I. P., Collier, M. R., & Cravens, T. E. 2011, in Bull. Am. Astron. Soc., #219.06
- McKay, A. J., Chanover, N. J., Dello Russo, N., Cochran, A. L., Harris, W. M., & **Morgenthaler, J. P.** 2011, in Lunar and Planetary Inst. Technical Report, Vol. 42, Lunar and Planetary Institute Science Conference Abstracts, 1621
- McKay, A., Chanover, N., **Morgenthaler, J.**, Cochran, A., Harris, W., & Dello Russo, N., *Forbidden Oxygen Lines in Comets C/2006 W3 Christensen and C/2007 Q3 Siding Spring*. 2010, Bull. Am. Astron. Soc., 42
- Morgenthaler, J. P.**, Harris, W. M., Combi, M. R., Feldman, P. D., & Weaver, H. A., *The GALEX Comets*. 2009, Bull. Am. Astron. Soc., 41
- Harris, W. M., & **Morgenthaler, J.**, *Measuring The Effect Of Collisional Acceleration In The Coma Of Active Comets: Study Of The CN And C<sub>2</sub> Radial Distributions And Production Rates In Comet C/1995O1 (Hale-Bopp)*. 2009, Bull. Am. Astron. Soc., 41, #15.02
- Morgenthaler, J. P.**, Harris, W. M., Combi, M. R., Feldman, P. D., & Weaver, H. A., *Wide-field Spectroscopic Observations of Comet 8P/Tuttle by GALEX*. 2008, Bull. Am. Astron. Soc., 40
- Harris, W. M., & **Morgenthaler, J. P.**, *Interacting Gas Flows In Split Comets: A Re-evaluation Of The Perigee Outburst Of C/1996b2 (Hyakutake)*. 2008a, Bull. Am. Astron. Soc., 40, #16.05
- Harris, W. M., & **Morgenthaler, J. P.**, *Interacting Gas Flows in Split Comets: A Re-Evaluation of the Perigee Outburst of C/1996B2 (Hyakutake)*. 2008b, LPI Contributions, 1405, 8383



- Oliversen, R. J., Walker, C., Donaldson, J. K., **Morgenthaler, J. P.**, Mierkiewicz, E., Roesler, F. L., Larson, E., Harris, W. M., Hussein, S. S., Lupie, O. L., Hilton, G. M., Carpena-Nunez, J., & Dawson, O. R. 2008, in AAS/Division for Planetary Sciences Meeting Abstracts, Vol. 40, AAS/Division for Planetary Sciences Meeting Abstracts, Poster #44.05
- Morgenthaler, J. P.**, Harris, W. M., Combi, M. R., Feldman, P. D., & Weaver, H. A., *Wide-field spectroscopic observations of comet C/2004 Q2 (Machholz) by GALEX*. 2006a, Bull. Am. Astron. Soc., 38
- Morgenthaler, J. P.**, Harris, W. M., & Combi, M. R., *Large Aperture [O I] 6300 Å Observations of Comet Hyakutake: Implications for the Photochemistry of OH and [O I] Production in Comet Hale-Bopp*. 2006b, Bull. Am. Astron. Soc., 38
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