

## CURRICULUM VITAE

### Jasper S. Halekas

**Address:** Space Sciences Laboratory, 7 Gauss Way, University of California, Berkeley, CA 94720-7450. **Work:** (510) 643-4310. **Fax:** (510) 643-8302. **Cell:** (510) 299-8571. **E-mail:** [jazzman@ssl.berkeley.edu](mailto:jazzman@ssl.berkeley.edu)

Dr. Jasper S. Halekas is an Assistant Research Physicist at the U.C. Berkeley Space Sciences Laboratory. His current research focuses on solar wind interaction with the solid surface, atmosphere/exosphere, and crustal magnetic fields of the Moon and Mars. Main research areas include lunar surface and dust charging, lunar wake and Martian magnetotail structure, the impact of solar energetic particles upon the lunar and Martian environments, and electron energization processes in those environments, as well as the geologic interpretation of lunar and Martian magnetic fields. Dr. Halekas is also active in designing and building space plasma instrumentation, including silicon semiconductor detectors and electrostatic analyzers.

Throughout his career, Dr. Halekas has been involved in the analysis of data from spacecraft, including Polar, Wind, Lunar Prospector, and Mars Global Surveyor, and he is currently PI or Co-I on eleven NASA data analysis grants. Dr. Halekas is a member of the NASA Lunar Science Institute team DREAM (Dynamic Response of the Environment at the Moon). He is also the instrument lead for the Solar Wind Ion Analyzer for the MAVEN Mars Scout, and a Co-I on the NSF-funded CubeSat project CINEMA

#### ***Education:***

Ph.D. Physics, U. C. Berkeley, 2003. M.A. Physics, U. C. Berkeley, 2000.  
B.S. Physics, B.S. Math, Magna Cum Laude, With Honors, U.W., 1997.

#### ***Research Experience:***

Assistant Research Physicist V, U.C. Berkeley, 2009-present.  
Assistant Research Physicist III, U.C. Berkeley, 2007-2009.  
Assistant Research Physicist I, U.C. Berkeley, 2005-2007.  
Visiting Postdoctoral Research Physicist, U.C. Berkeley, 2003-2005.  
Graduate Student Researcher with Prof. Robert Lin, U. C. Berkeley, 1998-2003.  
Undergraduate Research with Dr. Elden Whipple, U.W., 1996-1998.  
Undergraduate Research with Dr. Davin Larson, U. C. Berkeley, Summer 1995.  
Undergraduate Research with Dr. Robert Winglee, U.W., 1993-1994.

#### ***Technical Experience:***

*Mission and Data Analysis Experience:* Polar Hydra, Wind 3DP, Lunar Prospector MAG/ER, Mars Global Surveyor MAG/ER

*Laboratory/Instrumentation Experience:* Design and testing of electrostatic analyzers and silicon semiconductor detectors.

*Languages/OS's:* IDL, Fortran, C, HTML, Pascal, ADA, XP, UNIX, MAC, MS DOS.

***Professional Memberships:*** American Geophysical Union.

***Service:***

Referee for over twenty articles in Geophysical Research Letters, Journal of Geophysical Research, Meteoritics and Planetary Science, Earth Planets & Space, Space Science Reviews, and Icarus.

Review panelist for three NASA Data Analysis Programs.

Organizer of an AGU session on the Dynamic Lunar Environment.

### ***Awards and Honors:***

Instrument lead for the Solar Wind Ion Analyzer on the MAVEN Mars Scout mission.

P.I. for NASA Discovery Data Analysis Program Grant, U.C. Berkeley, 2007-2008.

NASA Graduate Student Researchers Program, U. C. Berkeley, 2001-2003.

NASA Space Grant Summer Fellowship, U. C. Berkeley, Summer 2000.

Department of Education Fellowship, U. C. Berkeley, 1998-1999.

NASA Space Grant Scholarship, University of Washington, 1993-1997.

### ***Invited Presentations:***

**J.S. Halekas**, V. Angelopoulos, D.G. Sibeck, K. Khurana, C.T. Russell, G.T. Delory, J.P. McFadden, J.W. Bonnell, D. Larson, Lunar plasma and exospheric science from ARTEMIS, *Lunar Dust, Plasma & Atmosphere: The Next Steps*, Invited Presentation, 2010.

**J.S. Halekas** and R.P. Lin, Determining lunar crustal magnetic fields and their origin, *Workshop on Science Associated with the Lunar Exploration Architecture*, Invited Presentation, 2007.

**J.S. Halekas**, D.A. Brain, R.P. Lin, and D.L. Mitchell, Global vs. mini-magnetospheres: Differences and Similarities, *Spring AGU 2007*, SM34A-06, Invited Presentation, 2007.

**J.S. Halekas**, D.A. Brain, L.M. Peticolas, R.P. Lin, J.G. Luhmann, D.L. Mitchell, S.W. Bougher, and D. Lummerzheim, Origin and expected variability of Martian aurorae, *COSPAR 2006*, C3.2-0010-06, Invited Presentation, 2006.

**J.S. Halekas**, D.A. Brain, R.P. Lin, and D.L. Mitchell, Comparative mini-magnetospheres: Moon and Mars, *COSPAR 2006*, D3.3-0022-06, Invited Presentation, 2006.

**J.S. Halekas**, Solar wind interaction with the lunar environment, *Fall AGU 2005*, SH41C-01, Invited Presentation, 2005.

### ***Selected Publications:***

**J.S. Halekas**, R.J. Lillis, R.P. Lin, M. Manga, M.E. Purucker, R.A. Carley, How strong are lunar crustal magnetic fields at the surface: Considerations from a reexamination of the electron reflectometry technique, *J. Geophys. Res.*, **115**, in press, doi:10.1029/JE003516, 2010.

R. Lillis, M.E. Purucker, **J. Halekas**, K. Louzada, S.T. Stewart, M. Manga, H. Frey, Study of impact demagnetization at Mars using Monte Carlo modeling and multiple altitude data, *J. Geophys. Res.*, **115**, in press, doi: 10.1029/JE003556, 2010.

M. Øieroset, D.A. Brain, E. Simpson, D.L. Mitchell, T.D. Phan, **J.S. Halekas**, R.P. Lin, M.H. Acuña, Search for Phobos and Deimos gas/dust tori using in situ observations from Mars Global Surveyor MAG/ER, *Icarus*, **206**, pp. 189-198, 2010.

D. Brain, S. Barabash, A. Boesswetter, S. Bougher, S. Brecht, G. Chanteur, D. Hurley, E. Dubinin, X. Fang, M. Fraenz, **J. Halekas**, E. Harnett, M. Holmstrom, E. Kallio, H. Lammer, S. Ledvina, M. Liehmon, K. Liu, J. Luhmann, Y. Ma, R. Modolo, A. Nagy, A. Motschmann,

- H. Nilsson, H. Shinagawa, S. Simon, N. Terada, A comparison of global models for the solar wind interaction with Mars, *Icarus*, **206**, pp. 139-151, 2010.
- M.O. Fillingim, L.M. Peticolas, R.J. Lillis, D.A. Brain, **J.S. Halekas**, D. Lummerzheim, S.W. Bougher, Localized ionization patches in the nighttime ionosphere of Mars and their electrodynamic consequences, *Icarus*, **206**, pp. 112-119, 2010.
- J.S. Halekas** and D.A. Brain, Global distribution, structure, and solar wind control of low altitude current sheets at Mars, *Icarus*, **206**, pp. 64-73, doi:10.1016/j.icarus.2008.12.032, 2010.
- J.S. Halekas**, J.P. Eastwood, D.A. Brain, T.D. Phan, M. Oieroset, R.P. Lin, In-situ observations of reconnection Hall magnetic fields at Mars: Evidence for ion diffusion region encounters, *J. Geophys. Res.*, **114**, A11204, doi:10.1029/JA014544, 2009.
- J.S. Halekas**, G.T. Delory, R.P. Lin, T.J. Stubbs, W.M. Farrell, Lunar surface charging during solar energetic particle events: Measurement and prediction, *J. Geophys. Res.*, **114**, A05110, doi:10.1029/2009JA014113, 2009.
- J.S. Halekas**, G.T. Delory, R.P. Lin, T.J. Stubbs, and W.M. Farrell, Lunar Prospector measurements of secondary electron emission from lunar regolith, *Planet. Space Sci.*, **57**, 78-82, doi:10.1016/j.pss.2008.11.009, 2009.
- Farrell, W.M., T.J. Stubbs, G.T. Delory, R.R. Vondrak, M.R. Collier, **J.S. Halekas**, R.P. Lin, Concerning the dissipation of electrically charged objects in the shadowed lunar polar regions, *Geophys. Res. Lett.*, **35**, L19104, doi:10.1029/2008GL034785, 2008.
- J.S. Halekas**, G.T. Delory, R.P. Lin, T.J. Stubbs, and W.M. Farrell, Lunar Prospector observations of the electrostatic potential of the lunar surface and its response to incident currents, *J. Geophys. Res.*, **113**, A09102, doi:10.1029/2008JA013194, 2008.
- F. Leblanc, O. Witasse, J. Lilensten, R.A. Frahm, Ali Safaenili, D.A. Brain, J. Mouginot, H. Nilsson, Y. Futaana, **J. Halekas**, M. Holmström, J.L. Bertaux, J.D. Winningham, W. Kofman, and R. Lundin, Observations of aurorae by SPICAM ultraviolet spectrograph on board Mars Express: Simultaneous ASPERA-3 and MARSIS measurements, *J. Geophys. Res.*, **113**, A08311, doi:10.1029/2008JA013033, 2008.
- J.S. Halekas**, G.T. Delory, D.A. Brain, R.P. Lin, and D.L. Mitchell, Density cavity observed over a strong lunar crustal magnetic anomaly in the solar wind: A mini-magnetosphere?, *Planet. Space Sci.*, **56/7**, 941-946, doi:10.1016/j.pss.2008.01.008, 2008.
- J.S. Halekas**, D.A. Brain, R.P. Lin, J.G. Luhmann, and D.L. Mitchell, Distribution and variability of accelerated electrons at Mars, *J. Adv. Space Res.*, **41**, p. 1347-1352, doi:10.1066/j.asr.2007.01.034, 2008.
- D.L. Mitchell, **J.S. Halekas**, R.P. Lin, S. Frey, L.L. Hood, M.H. Acuna, and A. Binder, Global mapping of lunar crustal magnetic fields by Lunar Prospector, *Icarus*, **194**, 401-409, doi:10.1016/j.icarus.2007.10.027, 2008.
- W.M. Farrell, T.J. Stubbs, **J.S. Halekas**, G.T. Delory, M.R. Collier, R.R. Vondrak, and R.P. Lin, Loss of solar wind plasma neutrality and affect on surface potentials near the lunar terminator, *Geophys. Res. Lett.*, **35**, L015105, doi:10.1029/2007GL032653, 2008.
- J.S. Halekas**, D.A. Brain, R.P. Lin, and D.L. Mitchell, Solar wind interaction with lunar crustal magnetic anomalies, *J. Adv. Space Res.*, **41**, p. 1319-1324, doi:10.1016/j.asr.2007.04.003, 2008.
- J.P. Eastwood, D.A. Brain, **J.S. Halekas**, J.F. Drake, T.D. Phan, M. Oieroset, D. Mitchell, R.P. Lin, and M. Acuna, Evidence for collisionless magnetic reconnection at Mars, *Geophys. Res. Lett.*, **35**, L02106, doi:10.1029/2007GL032289, 2008.

- D.A. Brain, R.J. Lillis, D.L. Mitchell, **J.S. Halekas**, and R.P. Lin, Electron pitch angle distributions as indicators of magnetic field topology near Mars, *J. Geophys. Res.*, **112**, A09201, doi:10.1029/2007JA012435, 2007.
- W.M. Farrell, T.J. Stubbs, R.R. Vondrak, G.T. Delory, and **J.S. Halekas**, Complex electric fields near the lunar terminator: The near-surface wake and accelerated dust, *Geophys. Res. Lett.*, **34**, L14201, doi:10.1029/2007GL029312, 2007.
- M.O. Fillingim, L.M. Peticolas, R.J. Lillis, D.A. Brain, **J.S. Halekas**, D.L. Mitchell, R.P. Lin, D. Lummerzheim, S.W. Bougher, and D.L. Kirchner, Model calculations of electron precipitation induced ionization patches on the nightside of Mars, *Geophys. Res. Lett.*, **34**, L12101, doi:10.1029/2007GL029986, 2007.
- T.J. Stubbs, **J.S. Halekas**, W.M. Farrell, and R.R. Vondrak, Lunar surface charging: A global perspective using Lunar Prospector data, *Workshop on Dust in Planetary Systems (ESA SP-643)*, Ed. H. Krueger and A. Graps, P. 181-184, 2007.
- J.S. Halekas**, G.T. Delory, D.A. Brain, R.P. Lin, M.O. Fillingim, C.O. Lee, R.A. Mewaldt, T.J. Stubbs, W.M. Farrell, and M.K. Hudson, Extreme lunar surface charging during solar energetic particle events, *Geophys. Res. Lett.*, **34**, L02111, doi:10.1029/2006GL028517, 2007.
- J.S. Halekas**, D.A. Brain, D.L. Mitchell, and R.P. Lin, Whistler waves observed near lunar crustal sources, *Geophys. Res. Lett.*, **33**, L22104, doi:10.1029/2006GL027684, 2006.
- F. Leblanc, O. Witasse, J. Winningham, D. Brain, J. Lilensten, P.-L. Blelly, R.A. Frahm, **J.S. Halekas**, and J.L. Bertaux, Origins of the Martian aurora observed by Spectroscopy for Investigation of Characteristics of the Atmosphere of Mars (SPICAM) on board Mars Express, *J. Geophys. Res.*, **111**, A09313, doi:10.1029/2006JA011763, 2006.
- J.S. Halekas**, D.A. Brain, R.J. Lillis, M.O. Fillingim, D.L. Mitchell, and R.P. Lin, Current sheets at low altitudes in the Martian magnetotail, *Geophys. Res. Lett.*, **33** (13), L13101, doi:10.1029/2006GL026229, 2006.
- D.A. Brain, D.L. Mitchell, and **J.S. Halekas**, The magnetic field draping direction at Mars from April 1999 through August 2004, *Icarus*, **182**(2), doi:10.1016/j.icarus.2005.09.023, 464-473, 2006.
- J.S. Halekas**, D.A. Brain, D.L. Mitchell, R.P. Lin, and L. Harrison, On the occurrence of magnetic enhancements caused by solar wind interaction with lunar crustal fields, *Geophys. Res. Lett.*, **33**, L08106, doi:10.1029/2006GL025931, 2006.
- D.A. Brain, **J.S. Halekas**, L.M. Peticolas, R.P. Lin, J.G. Luhmann, D.L. Mitchell, G.T. Delory, S.W. Bougher, M.H. Acuña, and H. Rème, On the origin of aurorae on Mars, *Geophys. Res. Lett.*, **33**, L01201, doi:10.1029/2005GL024782, 2006.
- D.A. Brain, **J.S. Halekas**, R. Lillis, D.L. Mitchell, R.P. Lin, and D.H. Crider, Variability of the altitude of the Martian sheath, *Geophys. Res. Lett.*, **32** (18), L18203, doi:10.1029/2005GL023126, 2005.
- J.S. Halekas**, S.D. Bale, D.L. Mitchell, and R.P. Lin, Electrons and magnetic fields in the lunar plasma wake, *J. Geophys. Res.*, **110**, A07222, doi:10.1029/2004JA010991, 2005.
- J.S. Halekas**, R.P. Lin, and D.L. Mitchell, Large negative lunar surface potentials in sunlight and shadow, *Geophys. Res. Lett.*, **32**, L09102, doi:10.1029/2005GL022627, 2005.
- J.S. Halekas**, R.P. Lin, and D.L. Mitchell, Inferring the scale height of the lunar nightside double layer, *Geophys. Res. Lett.*, **30**(21), 2117, doi:10.1029/2003GL018421, 2003.
- J.S. Halekas**, R.P. Lin, and D.L. Mitchell, Magnetic fields of lunar multi-ring impact basins, *Met. Planet. Sci.*, **38**, 565-578, 2003.

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- J.S. Halekas**, D.L. Mitchell, R.P. Lin, L.L. Hood, M.H. Acuña, and A.B. Binder, Demagnetization signatures of lunar impact craters, *Geophys. Res. Lett.*, **29**(13), doi:10.1029/2001GL013924, 2002.
- J.S. Halekas**, D.L. Mitchell, R.P. Lin, L.L. Hood, M.H. Acuña, and A.B. Binder, Evidence for negative charging of the lunar surface in shadow, *Geophys. Res. Lett.*, **29**(10), doi:10.1029/2001GL014428, 2002.
- J.S. Halekas**, D.L. Mitchell, R.P. Lin, S. Frey, L.L. Hood, M.H. Acuña, and A.B. Binder, Mapping of crustal magnetic anomalies on the lunar near side by the Lunar Prospector electron reflectometer, *J. Geophys. Res.*, **106**, 27841-27852, 2001.
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- E.C. Whipple, D.L. Starr, **J.S. Halekas**, J.D. Scudder, R.D. Holdaway, J.B. Faden, P. Puhl-Quinn, N.C. Maynard, and C.T. Russell, Magnetospheric electric fields from ion data, *Geophys. Res. Lett.*, **26**, 1561-4, 1999.
- E.C. Whipple, **J.S. Halekas**, J.D. Scudder, W.R. Paterson, L.A. Frank, R.B. Sheldon, N.C. Maynard, D.R. Weimer, C.T. Russell, K. Tsuruda, H. Hayakawa, and T. Yamamoto, Identification of magnetospheric particles that travel between spacecraft and their use to help obtain magnetospheric potential distributions, *J. Geophys. Res.*, **103**, 93-102, 1998.