

PUBLICATIONS of Dr. ANIL BHARDWAJ

CHAPTER in BOOK:

1. **Anil Bhardwaj** and Carey M. Lisse
X-rays in the Solar System.
in *Encyclopedia of the Solar System, 2nd Edition*, Edited by L. A. McFadden, P. R. Weissman, and T. V. Johnson, pp.637-658, Academic Press (2007).
2. **A. Bhardwaj**
Non-Stationary Plasma Process on Comets and its Implications.
In *Recent Advances in Plasma Science and Technology*, Eds. R.P. Singh, et al., Allied Publishers Ltd., New Delhi, pp131-134 (1996).

JOURNAL PUBLICATIONS:

3. **A. Bhardwaj**, S.A. Haider, and R.P. Singhal, Auroral and Photoelectron Fluxes in Cometary Ionospheres.
Icarus, 85, 216-228 (1990).
4. **A. Bhardwaj** and R.P. Singhal, Auroral and Dayglow Processes on Neptune.
Indian Journal of Radio and Space Physics, 19, 171-176 (1990).
5. R.P. Singhal and **A. Bhardwaj**, Monte Carlo Simulation of Photoelectron Energization in Parallel Electric Fields: Electroglow on Uranus.
Journal of Geophysical Research, 96, 15963-15972 (1991).
6. R.P. Singhal, S.C. Chakravarty, **A. Bhardwaj**, and B. Prasad, Energetic Electron Precipitation in Jupiter's Upper Atmosphere.
Journal of Geophysical Research, 97, 18245-18256 (1992).
7. S.A. Haider, **A. Bhardwaj**, and R.P. Singhal, Role of Auroral and Photoelectrons on the Abundances of Methane and Ammonia in the Coma of Comet Halley.
Icarus, 101, 234-243 (1993).
8. **A. Bhardwaj** and R.P. Singhal, Optically Thin H Lyman Alpha Production on Outer Planets: Low-Energy Proton Acceleration in Parallel Electric Fields and Neutral H Atom Precipitation from Ring Current.
Journal of Geophysical Research, 98, 9473-9481 (1993).
9. **A. Bhardwaj**, S. A. Haider, and R. P. Singhal, Consequences of Cometary Aurora on the Carbon Chemistry at Comet P/Halley.
Advances in Space Research, 16(2), 31-36 (1995).
10. **A. Bhardwaj**, S. A. Haider, and R. P. Singhal, Production and Emissions of Atomic Carbon and Oxygen in the Inner Coma of Comet Halley: Role of Electron Impact.
Icarus, 120, 412-430 (1996).
11. **A. Bhardwaj** and M. Michael, Photoelectron Excitation of Io's Atmosphere.
Advances in Space Research, 20(2), 301-304 (1997).
12. S.A. Haider and **A. Bhardwaj**, Chemistry of the Ions ≤ 40 AMU in the Inner Coma of Comet Halley.
Advances in Space Research, 20(2), 291-294 (1997).

13. M. Michael and **A. Bhardwaj**, On the Dissociative ionization of SO₂ in the Io's Atmosphere. *Geophysical Research Letters*, 24, 1971-1974 (1997).
14. **A. Bhardwaj**, Ring current H Atom Precipitation on the Outer Planets. *Advances in Space Research*, 20(2), 233-237 (1997).
15. **A. Bhardwaj**, On the Role of Solar EUV, Photoelectrons, and Auroral Electrons in the Chemistry of C(¹D) and the Production of CI 1931 Å in the Inner Cometary Coma: A Case for Comet P/Halley. *Journal of Geophysical Research*, 104, 1929-1942 (1999).
16. **A. Bhardwaj** and M. Michael, On the Excitation of Io's Atmosphere by the Photoelectrons: Application of the Analytical Yield Spectrum of SO₂. *Geophysical Research Letters*, 26, 393-396 (1999).
17. **A. Bhardwaj** and S.A. Haider, Modeling of Metastable Carbon Atoms in Comets: Implications for ROSETTA. *Advances in Space Research*, 23(7), 1325-1328 (1999).
18. **A. Bhardwaj** and M. Michael, Monte Carlo Model for Electron Degradation in SO₂ Gas: Cross Sections, Yield Spectra and Efficiencies. *Journal of Geophysical Research*, 104, 24713-24728 (1999).
19. **A. Bhardwaj** and G.R. Gladstone, Auroras on Saturn, Uranus, and Neptune. *Advances in Space Research*, 26(10), 1551-1558 (2000).
20. M. Michael and **A. Bhardwaj**, Precipitation of Energetic Electrons in the Atmosphere of Io: Production of UV Emissions. *Advances in Space Research*, 26(10), 1519-1524 (2000).
21. **A. Bhardwaj** and G.R. Gladstone, Auroral Emissions of the Giant Planets. *Reviews of Geophysics*, 38, 295-353 (2000).
22. M. Michael and **A. Bhardwaj**, FUV Emissions on Io: Role of Galileo-Observed Field-Aligned Energetic Electrons. *Geophysical Research Letters*, 27, 3137-3140 (2000).
23. **A. Bhardwaj**, G.R. Gladstone, and P. Zarka, An Overview of Io Flux Tube Footprints in Jupiter's Auroral Ionosphere. *Advances in Space Research*, 27, No.11, 1915-1922 (2001).
24. G.R. Gladstone, J.H. Waite, Jr., D. Grodent, W.S. Lewis, F.J. Crary, R.F. Elsner, M.C. Weiskopf, T. Majeed, J.-M. Jahn, **A. Bhardwaj**, J.T. Clarke, D.T. Young, M.K. Dougherty, S.A. Espinosa, T.E. Cravens, A Pulsating Auroral X-Ray Hot Spot on Jupiter. *Nature*, 415, 1000-1003 (2002).
25. **A. Bhardwaj** and S.A. Haider, Chemistry of O(¹D) Atoms in the Inner Coma: Implications for Cometary Missions. *Advances in Space Research*, 29, No.5, 745-750 (2002).
26. **A. Bhardwaj**, G. R. Gladstone, R. F. Elsner, J. H. Waite, Jr., D. Grodent, T. E. Cravens, R. R. Howell, A. E. Metzger, N. Ostgaard, A. N. Maurellis, R. E. Johnson, M. C. Weiskopf, T. Majeed, P. G. Ford, A. F. Tennant, J. T. Clarke, W. S. Lewis, K. C. Hurley, F. J. Crary, E. D.

- Feigelson, G. P. Garmire, D. T. Young, M. K. Dougherty, S. A. Espinosa, J.-M. Jahn, Soft X-Ray Emissions from Planets, Moons, and Comets.
ESA Special Publication 514, 215-226 (2002).
27. R.F. Elsner, G.R. Gladstone, J.H. Waite, Jr., F.J. Crary, R.R. Howell, R.E. Johnson, P.G. Ford, A.E. Metzger, K.C. Hurley, E.D. Feigelson, G.P. Garmire, **A. Bhardwaj**, D. Grodent, T. Majeed, A.F. Tennant, M.C. Weisskopf, Discovery of Soft X-Ray Emission from Io, Europa and the Io Plasma Torus.
Astrophysical Journal, 572, 1077-1082 (2002).
 28. **A. Bhardwaj** and M. Michael, Io-Jupiter System: A Unique Case of Moon-Planet Interaction.
ESA Special Publication 514, 115-121 (2002).
 29. **A. Bhardwaj**, On the Solar EUV Deposition in the Inner Coma of Comets with Large Gas Production Rates.
Geophysical Research Letters, 30(24), 2244, PLA 2/1-5 (2003).
 30. **A. Bhardwaj**, X-ray Emissions from the Jovian System.
Bulletin of Astronomical Society of India, 31, 159-166 (2003).
 31. T. Majeed, J. H. Waite, Jr., S. W. Bougher, R. V. Yelle, G. R. Gladstone, J. C. McConnell, and **A. Bhardwaj**, The Ionospheres-Thermospheres of the Giant Planets.
Advances in Space Research, 33, No.2, 197-211 (2004).
 32. P. Vatti Palle, J. M. Ajello, and **A. Bhardwaj**, The High Resolution Far Ultraviolet Spectrum of Electron-Excited SO₂.
Journal of Geophysical Research, 109, A02310, pp.1-17 (2004).
 33. O. P. Makarov, J. M. Ajello, P. Vatti Palle, I. Kanik, M. C. Festou, and **A. Bhardwaj**, Kinetic Energy Distributions and Line Profile Measurements of Dissociation Products of Water Upon Electron Impact.
Journal of Geophysical Research, 109, A09303, pp.1-15 (2004).
 34. R. F. Elsner, N. Lugaz, J. H. Waite, Jr., T. E. Cravens, G. R. Gladstone, P. Ford, D. Grodent, **A. Bhardwaj**, R. J. MacDowall, M. D. Desch, and T. Majeed, Simultaneous Chandra X-ray, HST Ultraviolet, and Ulysses Radio Observations of Jupiter's Aurora.
Journal of Geophysical Research, 110, A01207, pp.1-16 (2005).
 35. **Anil Bhardwaj**, G. Branduardi-Raymont, R. F. Elsner, G. R. Gladstone, G. Ramsay, P. Rodriguez, R. Soria, J. H. Waite, Jr., and T. E. Cravens, Solar Control on Jupiter's Equatorial X-ray Emissions: 26-29 November 2003 XMM-Newton Observation.
Geophysical Research Letters, 32, L03S08, pp.1-5 (2005).
 36. **Anil Bhardwaj**, Discussion on Forum Article "What is the Aurora".
EOS Transactions, American Geophysical Union, vol. 86, No.11, 110 (2005).
 37. Joseph Ajello, Prahlad Vatti Palle, Hervé Abgrall, Evelyne Roueff, **Anil Bhardwaj**, and Jacques Gustin, The Electron Excited UV Spectrum of HD: Cross Sections and Transition Probabilities.
Astrophysical Journal Supplement Series, 159, 314-330 (2005).
 38. **Anil Bhardwaj**, R. F. Elsner, J. H. Waite, Jr., G. R. Gladstone, T. E. Cravens, and P.G. Ford, Chandra Observation of an X-ray Flare at Saturn: Evidence for Direct Solar Control on Saturn's Disk X-ray Emissions
Astrophysical Journal Letters, 624, L121-L124 (2005).

39. **Anil Bhardwaj**, R. F. Elsner, J. H. Waite, Jr., G. R. Gladstone, T. E. Cravens, and P.G. Ford, The Discovery of Oxygen K α X-ray Emission from the Rings of Saturn. *Astrophysical Journal Letters*, 627, L73-L76 (2005).
40. S.A. Haider and **Anil Bhardwaj**, Radial Distribution of Production Rates, Loss Rates and Densities Corresponding to Ion Masses ≤ 40 amu in the Inner Coma of Comet Halley: Composition and Chemistry. *Icarus*, 177, 196-216 (2005).
41. **Anil Bhardwaj**, Stas Barabash, Yoshifumi Futaana, Yoichi Kazama, Kazushi Asamura, R. Sridharan, Mats Holmström, Peter Wurz, and Rickard Lundin, Low Energy Neutral Atom Imaging on the Moon with the SARA Instrument aboard Chandrayaan-1 Mission *Journal of Earth System Sciences*, 114 (No.6), 749-760 (2005).
42. G. Branduardi-Raymont, **A. Bhardwaj**, R. Elsner, G. Gladstone G. Ramsay, P. Rodriguez, R. Soria, J. H. Waite, T.E. Cravens, X-ray Exploration of the Giant Planets, their Magnetospheres and the Solar Connection: From XMM-Newton to XEUS. *ESA Special Publication ESA SP-588*, pp.393-396 (2005).
43. M.T. Capria, G. Cremonese, **A. Bhardwaj**, and M.C. De Sanctis, O(¹S) and O(¹D) emission lines in the spectrum of 153P/2002 C1 (Ikeya-Zhang). *Astronomy and Astrophysics*, 442, 1121–1126 (2005)
44. Yoshifumi Futaana, Stas Barabash, Mats Holmström, and **Anil Bhardwaj**, Low Energy Neutral Atoms Imaging of the Moon. *Planetary and Space Science*, 54 (no.2), 132-143 (2006).
45. K. Dennerl, C. M. Lisse, **A. Bhardwaj**, V. Burwitz, J. Englhauser, H. Gunell, M. Holmstrom, F. Jansen, V. Kharchenko, and P. Rodriguez, First observation of Mars with XMM-Newton: High resolution X-ray spectroscopy with RGS. *Astronomy and Astrophysics*, 451, 709-722 (2006).
46. Yoichi Kazama, Stas Barabash, **Anil Bhardwaj**, Kazushi Asamura, Yoshifumi Futaana, Mats Holmström, Rickard Lundin, R. Sridharan, and Peter Wurz, Energetic Neutral Atom Imaging Mass Spectroscopy of the Moon and Mercury Surfaces. *Advances in Space Research*, 37, No. 1, 38-44 (2006).
47. G. Branduardi-Raymont, **A. Bhardwaj**, R. Elsner, G. Gladstone G. Ramsay, P. Rodriguez, R. Soria, J. H. Waite, and T.E. Cravens, XMM-Newton Observations of X-ray Emission from Jupiter. *ESA Special Publication ESA SP-604*, Vol. 1, pp. 15-20 (2006).
48. **Anil Bhardwaj**, G. Randall Gladstone, Ronald F. Elsner, Nikolai Østgaard, J. Hunter Waite, Jr., Thomas E. Cravens, Shen-Wu Chang, Tariq Majeed, and Albert E. Metzger, First Terrestrial Soft X-ray Auroral Observation by the Chandra X-ray Observatory. *Journal of Atmospheric and Solar-Terrestrial Physics*, 69 (No.1-2), 179-187 (2007).
49. T. E. Cravens, J. Clark, **A. Bhardwaj**, R. F. Elsner, J. H. Waite, Jr., A. N. Maurellis, and G. R. Gladstone, and G. Branduardi-Raymont, X-Ray Emission from the Outer Planets: Albedo for Scattering and Fluorescence of Solar X-Rays. *Journal of Geophysical Research*, 111, A07308, pp.1-11 (2006).

50. G. Branduardi-Raymont, **A. Bhardwaj**, R. Elsner, G. Gladstone G. Ramsay, P. Rodriguez, R. Soria, J. H. Waite, and T.E. Cravens, XMM-Newton Observations of X-ray Emission from Jupiter.
Advances in Geosciences, Vol. 3, 203-214 (2006).
51. Marina Galand, **Anil Bhardwaj**, and Supriya Chakrabarti, On the Importance of the Cross-body Approach in Planetary Aeronomy.
Advances in Geosciences, Vol. 2, 239-248 (2006).
52. **Anil Bhardwaj**, X-ray emission from Jupiter, Saturn, and Earth: A Short Review
Advances in Geosciences, vol.3, 215-230 (2006).
53. W. -H. Ip, I. -G. Jiang, D. Kinoshita, L.N. Hau, A. Fujiwara, Y. Saito, F. Yoshida, K.W. Min, **A. Bhardwaj**, H. Boehnhardt, P. Hartogh, T. M. Capria, G. Cremonese, A. Milillo, S. Orisini, D. Gautier, D. Jewitt, and T. Owen, A Mission Called SAPPORO.
Advances in Geosciences, vol.3, 241-253 (2006).
54. **Anil Bhardwaj**, Ronald F. Elsner, G. Randall Gladstone, J. Hunter Waite, Jr., Graziella Branduardi-Raymont, Thomas E. Cravens, and Peter Ford, Low- to Mid-Latitude X-Ray Emission from Jupiter.
Journal of Geophysical Research, 111, A11225, p. 1-16 (2006).
55. Andrew W. Yau, **Anil Bhardwaj**, Iver H. Cairns, C. Z. Cheng, Wing H. Ip, Yasumasa Kasaba, Kyoung W. Min, Masato Nakamura, Yoshifumi Saito, Solar Terrestrial and Planetary Science Missions in Asia-Oceania: Opportunities for Collaborative Research.
Advances in Geosciences, vol. 2, 249-264 (2006).
56. G. Branduardi-Raymont, **A. Bhardwaj**, R. F. Elsner, G. R. Gladstone, G. Ramsay, P. Rodriguez, R. Soria, J. H. Waite, Jr., and T. E. Cravens, A study of Jupiter's aurorae with XMM-Newton
Astronomy and Astrophysics, 463, 761–774 (2007).
57. **Anil Bhardwaj**, Ronald F. Elsner, G. Randall Gladstone, Thomas E. Cravens, Carey M. Lisse, Konrad Dennerl, Graziella Branduardi-Raymont, Bradford J. Wargelin, J. Hunter Waite, Jr., Ina Robertson, Nikolai Ostgaard, Peter Beiersdorfer, Steven L. Snowden, and Vasili Kharchenko, X-rays from Solar System Bodies.
Planetary and Space Science, in press, (2007). doi:10.1016/j.pss.2006.11.009
58. G. Branduardi-Raymont, **A. Bhardwaj**, R. F. Elsner, G. R. Gladstone G. Ramsay, P. Rodriguez, R. Soria, J. H. Waite, Jr., and T.E. Cravens, Latest results on Jovian disk X-rays from XMM-Newton.
Planetary and Space Science, in press (2007). doi:10.1016/j.pss.2006.11.017
59. D. McCann, S. Barabash, H. Nilsson, and **A. Bhardwaj**, Miniature Ion Mass Analyser
Planetary and Space Science, in press (2007). doi:10.1016/j.pss.2006.11.020
60. M.T. Capria, G. Cremonese, **A. Bhardwaj**, M. C. De Sanctis, and E. Mazzotta Epifani, Oxygen emission lines in the high resolution spectra of 9P/Tempel 1 during the Deep Impact event.
Astronomy and Astrophysics, (2007).
61. G. Branduardi-Raymont, **A. Bhardwaj**, R. F. Elsner, G. R. Gladstone, G. Ramsay, P. Rodriguez, R. Soria, J. H. Waite, Jr., and T. E. Cravens
Thermal and Non-thermal components of X-rays emissions from Jupiter.
Progress of Theoretical Physics Supplement, submitted (2007)

SCIENTIFIC REPORT:

1. **A. Bhardwaj**
Airglow on the Outer Planets.
Scientific Report of Space Physics laboratory, VSCC, SPL-SR-01-97 (1997).

Publication in Proceedings:

1. **Anil Bhardwaj** and R. Sridharan, Planetary Sciences in India – Recent Developments, *Proceedings of IAA Asia-Pacific Regional conference on “Advances in Planetary Exploration”* (2005).
2. **Anil Bhardwaj**, Planetary X-rays: Relationship with solar X-rays and solar wind, *Proceedings of ILWS Workshop 2006*, p.140-145 (2006).

Conference/Symposium presentations

More than 100 conference presentations, 20 of which are **invited presentations**. About 40 of the presentations are at National conferences and the rest at International conferences.
