

SHADIA RIFAI HABBAL

*Institute for Astronomy, University of Hawaii
2680 Woodlawn Drive
Honolulu, HI 96822*

BIOGRAPHY: NARRATIVE

Shadia Habbal has adopted a synergistic approach to research throughout her scientific career by complementing modeling with observations of the solar corona and the heliosphere. Her scientific output is almost equally weighted between observations, data analysis and modeling. With over 100 publications in refereed journals, she has explored the role of magneto-hydrodynamic waves in the heating of the corona and the acceleration of the solar wind. She has also embarked on explorations of the source regions of the solar wind. Using both ground-based (visible and radio) and space-based (visible and ultraviolet) observations, she has explored the behavior of heavy ions in the solar corona, which, although a minority constituent of the solar wind, seem, at present, to hold most of the clues to the processes that heat the corona and accelerate the solar wind.

Her early efforts at leading an eclipse expedition to India in 1995, have led to the establishment of a small international group of "solar wind sherpas" as she has nicknamed her group, with a record number of discoveries from observations of five eclipses between 2001 and 2010.

In addition to an active research career, she has been involved in teaching at the graduate and undergraduate level, as well as advising and overseeing the theses of four PhD students.

She has also been an active member of the solar and heliospheric community at large. She has served on a number of advisory panels for NASA as well as in the UK when she was a chaired professor at the University of Wales in Aberystwyth. She also served as one of three editors for the Journal of Geophysical Research - Space Physics. She led the organization of two international conferences, and played a key role in the organization of meetings of the Solar Physics Division of the American Astronomical Society for which she is the current Chair. She is currently on the faculty at the Institute for Astronomy of the University of Hawaii, where she also serves as Faculty Chair.

CURRICULUM VITAE

Education and Academic Background

- Ph.D. Physics, University of Cincinnati, 1977
 M.Sc. Physics, University of Cincinnati, 1974
 M.Phil. Physics, American University of Beirut, 1973
 B.Sc. Physics and Mathematics, University of Damascus, 1970

Academic and Research Positions

- 2006- Faculty Chair, Institute for Astronomy, University of Hawaii
 2005- Astronomer, Institute for Astronomy, University of Hawaii
 2000-2004 Chaired Professor in Solar-Terrestrial Physics, University of Wales, Aberystwyth, UK
 1982-2004 Research Physicist, Smithsonian Astrophysical Observatory, Cambridge, MA
 1995-2000 Lecturer, Harvard University
 1978-1982 Research Associate, Harvard College Observatory, Cambridge, MA
 1977-1978 Advanced Studies Program Fellow, National Center for Atmospheric Research, Boulder, CO

Editorship: Scientific Journals

- 2002-2006 **Editor**, *Journal of Geophysical Research - Space Physics*
 1994-1997 **Associate Editor**, *Journal of Geophysical Research-Space Physics*
 1994-1997 **Editor**, *SolarNews*

Editorship: Books

- S. Rifai Habbal, R. Esser, J. V. Hollweg, and P. Isenberg, Eds., *Solar Wind Nine*, AIP CP 471, 1999
 S. Rifai Habbal, Editor, *Robotic Exploration Close to the Sun: Scientific Basis*, AIP CP 385, 1997
 D. Winterhalter, J. Gosling, S. Rifai Habbal, W. Kurth and M. Neugebauer, Eds., *Solar Wind Eight*, AIP CP 382, 1996

Awards

- Pioneer*, Arab Thought Foundation, 2004
Certificate of Guest Professor from the University of Science and Technology of China, Hefei, September 4, 2001.
NASA Group Achievement Award, *Spartan 201 white Light Coronagraph Team*, Washington DC, August 14, 2000
Adventurous Women Lecture Series Award Harvard-Smithsonian Center for Astrophysics Women's Program Committee, June 8, 1998
Certificate of Appreciation for outstanding service and support - Harvard-Smithsonian Center for Astrophysics, December 19, 1997
Certificate of Appreciation for outstanding service - National Research Council, Board on Atmo-

spheric Sciences and Climate, 1996

Certificate of Award in recognition of special achievement reflecting a high standard of accomplishment - Smithsonian Institution, July 25, 1993

Committees

National and International.

2009-2011 Chair, Solar Physics Division of the AAS

2008-2009 Vice-Chair, Solar Physics Division of the AAS

2004-2007 Member, Solar Probe Science and Technology Definition Team

2001-2004 Member, Solar System Advisory Panel, PPARC

2001-2003 Member, EISCAT Committee on the future of EISCAT

2001-2002 Chair, Hale Prize Committee, Solar Physics Division of AAS

2000-2001 Member, Hale Prize Committee, Solar Physics Division of AAS

1999 Member, Solar Physics panel of the NAS decadal study on Astronomy and Astrophysics

1995-1998 Member of the NASA Science Definition Team for the Solar Probe Mission

1994-1997 Member, NASA Space Physics Subcommittee

1994-1997 Secretary, Solar Physics Division of the AAS

1994-1996 Member, NASA Cosmic and Heliospheric MOWG

1993-1996 Member, Committee on Solar-Terrestrial Research, National Research Council

1992-1994 Member, Executive Committee, APS Division of Computational Physics

Harvard-Smithsonian Center For Astrophysics.

1994-1996 Coordinator, CfA Women's Program Committee

1992-1993 Chair, Center for Astrophysics Fellowship Committee

1991-1993 Member, Center for Astrophysics Fellowship Committee

Institute for Astronomy and University of Hawaii.

2006 - Faculty Advisory Committee

2006 - Executive Committee

2005 - Qualifying Exam Committee

2006 - Graduate Research Oversight Committee (GROG)

2005 - Graduate Admissions Committee

2005 - Scientific Staff Screening Committee

2005 - Visitors' Program Committee

2006 Astronomy Personnel Subcommittee

2006 Tenure and Promotion Review Committee (TPRC)

Organization of Activities at Professional Conferences

2009 Chair, Scientific Organizing Committee for the 2009 AAS/SPD meeting, Boulder, CO

2007 Member, Local and Scientific Organizing Committees for the 2007 AAS/SPD meeting, Honolulu, HI

2003 Organizer of session GAIV-01 of the IAGA conference, Sapporo, Japan, July 2003

- 2002 Member of the Scientific Organizing Committee and Session Chair of Solar Wind 10 International Conference, Pisa, May 2002
- 2001 Organizer of Mini-Workshop on Origin and Expansion of the Solar Wind, Gregynog, Wales, October 2001
- 1997-98 Chair of the Scientific and Local Organizing Committees: *Solar Wind 9 Conference*, Nantucket, MA, October 1998.
- 1996 Chair of the Scientific and Local Organizing Committees: *Marlboro Workshop on Scientific Basis for Robotic Exploration Close to the Sun*, Marlboro, MA, April 1996
- 1994-1995 Member of the Scientific Organizing Committee, and Session I Chair, *Solar Wind 8 International Conference*, Dana Point, June 1995

Membership in Professional Societies

Royal Astronomical Society
 American Astronomical Society
 American Geophysical Union
 American Physical Society
 Association for Women in Science
 European Geophysical Society
 International Astronomical Union

Eclipse Expedition Leader

1995 India
 1997 Mongolia
 1998 Guadeloupe
 1999 Syria
 2001 Zambia
 2003 South Africa
 2006 Libya
 2008 China
 2009 Enewetak, Marshall Islands
 2010 Tatakoto, French Polynesia

Languages

Fluent in written and spoken Arabic and French. Some written and spoken German.

BIBLIOGRAPHY

PUBLICATIONS IN REFEREED JOURNALS

- S. Rifai Habbal, M. Druckmüller, H. Morgan, A. Ding, J. Johnson, H. Druckmüllerová, A. Daw, M. Arndt, M. Dietzel & J. Saken, Thermodynamics of the Solar Corona and Evolution of the Solar Magnetic Field as Inferred from the Total Solar Eclipse Observations of 11 July 2010, *Astrophys. J.*, 734, June 2011
- H. S. Byrthing, S. R. Cranmer, O. Lie-Svendson, S. R. Habbal and R. Esser, Modeling iron abundance enhancements in the slow solar wind, *Astrophys. J.*, 732, 119, 2011
- S. Rifai Habbal, M. Druckmüller, H. Morgan, I. Scholl, A. Daw, V. Rusin, J. Johnson, & M. Arndt, Total Solar Eclipse Observations of Hot Prominence Shrouds, *Astrophys. J.*, 719, 1362-1369, 2010
- H. Morgan, & S. Rifai Habbal, A Method for Separating Coronal Mass Ejections from the Quiescent Corona, *Astrophys. J.*, 711, 631-640, 2010
- S. Rifai Habbal, H. Morgan, M. Druckmüller, & A. Ding, On the Constancy of the Electron Temperature in the Expanding Corona Throughout Solar Cycle 23, *Astrophys. J.*, 711, L75-L78, 2010
- H. Morgan, & S. Rifai Habbal, Observational aspects of the three-dimensional coronal structure over a solar activity cycle, *Astrophys. J.*, 710, 1-15, 2010
- S. Rifai Habbal, M. Druckmüller, H. Morgan, A. Daw, J. Johnson, A. Ding, M. Arndt, R. Esser, V. Rusin & I. Scholl, Mapping the Distribution of Electron Temperature and Fe Charge States in the Corona with Total Solar Eclipse Observations, *Astrophys. J.*, 708, 1650-1662, 2010
- A. C. Richie-Halford, I. Iess, P. Tortora, J. W. Armstrong, S. W. Asmar, R. Woo, S. R. Habbal and H. Morgan, Space-time localization of inner heliospheric plasma turbulence using multiple spacecraft radio links, *Space Weather*, 7, S12003, doi:10.1029/2009SW000499, 2009
- H. Morgan, S. Rifai Habbal & N. Lougaz, Mapping the Structure of the Corona Using Fourier Backprojection Tomography, *Astrophys. J.*, 690, 1119-1129, 2009
- H. Morgan, S. Fineschi, S. R. Habbal & B. Li, In situ spectroscopy of the solar corona, *A&A*, 482, 981, 2008
- S. Rifai Habbal, I. Scholl & S. McIntosh, Impact of active regions on coronal hole outflows, *ApJ Letters*, 683, L75-L78, 2008
- I. Scholl and S. Rifai Habbal, Automatic Detection and Classification of Coronal Holes and Filaments Based on EUV and Magnetogram Observations of the Solar Disk, *Solar Phys.*, 248, 425, [doi10.1007/s11207-007-9075-6], 2008
- S. Rifai Habbal, H. Morgan, J. Johnson, M. Arndt, A. Daw, S. Jaeggli, J. Kuhn and D. Mickey, Localized Enhancements of Fe+10 Density in the Corona as Observed in Fe XI 789.2 nm during the 2006 March 29 Total Solar Eclipse, *Astrophys. J.*, 663, 598, 2007
- S. Rifai Habbal, H. Morgan, J. Johnson, M. Arndt, A. Daw, S. Jaeggli, J. Kuhn and D. Mickey, Erratum: Localized Enhancements of Fe+10 Density in the Corona as Observed in Fe XI 789.2 nm during the 2006 March 29 Total Solar Eclipse, *Astrophys. J.*, 670, 1521, 2007
- H. Morgan and S. Rifai Habbal, The long-term stability of the visible F corona at heights of 3-6

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- M. M. Bisi, R. A. Fallows, A. R. Breen, S. Rifai Habbal, and R. A. Jones, R. A., Large-scale structure of the fast solar wind *J. Geophys. Res.*, Vol.112, No A6, A06101, 2007
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- H. Morgan, and S. Rifai Habbal, An empirical 3D model of the large-scale coronal structure based on the distribution of H α filaments on the solar disk, *A&A*, 464, 357-365, 2007
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- X. Li, S. R. Habbal, J. Kohl and G. C. Noci, The effect of temperature anisotropy on observations of Doppler dimming and pumping in the inner corona, *Astrophys. J.*, **501**, L103, 1998.
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- *S. R. Habbal, R. Woo, S. Fineschi, R. O'Neal, J. Kohl, G. Noci, and C. Korendyke, Origins of the slow and the ubiquitous fast solar wind, *Astrophys. J.*, **489**, L103, 1997.
- * **Results featured in**
- Science*, **278**, 387, 1997, by J. Glantz
- Nature*, **390**, 235, 1997, by K. Southwell, and
- Astronomy Magazine*, March 98 by R. Graham
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- R. Woo and S. R. Habbal, Extension of coronal structure into interplanetary space, *Geophys. Res. Lett.*, **24**, 1159, 1997.
- R. Esser, S. R. Habbal, Wm. A. Coles and J. V. Hollweg, Hot protons in the inner corona and their effect on the flow properties of the solar wind, *J. Geophys. Res.*, **102**, 7063, 1997.
- R. Woo and S. R. Habbal, Finest filamentary structures of the inner corona in the slow and fast solar wind, *Astrophys. J.*, **464**, L139, 1997.
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- T. Fla, S. R. Habbal, T. E. Holzer and E. Leer, Fast Mode MHD Waves in Coronal Holes and the Solar Wind, *Astrophys. J.*, **280**, 382, 1984.
- S. R. Habbal and K. Tsinganos, Multiple Transonic Solutions with a New Class of Shock Transitions in Steady Isothermal Solar and Stellar Winds, *J. Geophys. Res.*, **88**, 1965, 1983.
- S. R. Habbal and E. Leer, Electron Heating by Fast-Mode MHD Waves in the Solar Wind Emanating from Coronal Holes, *Astrophys. J.*, **253**, 318, 1982.
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- S. R. Habbal and R. Rosner, Thermal Instabilities in Magnetically Confined Plasmas: Solar Coronal Loops, *Astrophys. J.*, **234**, 1113, 1979.
- S. R. Habbal, E. Leer and T. E. Holzer, Heating of Coronal Loops by Fast Mode MHD Waves, *Solar Phys.*, **64**, 287, 1979.
- S. R. Habbal and T. F. Tuan, Plane MHD Flows in a Hyperbolic Magnetic Field: Implications for the Problem of Magnetic Field Line Reconnection, *J. Plasma Phys.*, **21**, 85, 1979.
- S. R. Habbal and H. A. Mavromatis, Microscopic Nuclear Magnetic Moment Calculations Including Hartree-Fock Graphs, *Nuclear Physics*, **A223**, 174, 1974.

THESES

- Ph.D. Thesis:* A Two-Dimensional MHD Model for Magnetic Field Line Reconnection in an Incompressible and Inviscid Plasma, University of Cincinnati, Ohio, July, 1977.
- M.S. Thesis:* Importance of Hartree-Fock Graphs in Microscopic Nuclear Magnetic Moment Calculations, American University of Beirut, Lebanon, April, 1973.

PUBLICATIONS IN CONFERENCE PROCEEDINGS

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INVITED PRESENTATIONS AND COLLOQUIA

- Hot Prominence Shrouds*, American Geophysical Fall Meeting, San Francisco, 17 December 2010
- Total Solar Eclipses and the Physics of the Corona*, High Altitude Observatory, Boulder, 10 November 2010
- Probing Coronal Plasmas with Total Solar Eclipse Observations*, University of Tromso, Norway, 7 October 2010
- Eclipse Observations of the Fe XI 7892 Å line*, NASA/GSFC, 23 October 2009
- The Role of Heavy Ions in Exploring the Solar Corona*, Technische Universität Berlin, Germany, 6 October 2009
- Exploring the Acceleration Region of the Solar Wind with Heavy Ions*, Brno University of Technology, Czech Republic, 1 October 2009
- The Role of Heavy Ions in the Solar Wind*, First Arabic Conference on Astronomy & Geophysics, Cairo, Egypt, 22 October 2008
- Detecting the Imprint of Heavy Ions in the Corona with Total Solar Eclipse Observations*, IUGG 2007, Perugia, 2 July 2007
- Following the Trail of Heavy Ions through the Solar Corona and into the Solar Wind*, 210th AAS-SPD meeting, Honolulu, 31 May 2007
- Investigating the Link between the Solar Surface, Corona and Inner Heliosphere*, COSPAR, Paris, 22 July 2004
- Silicon Nanoparticles as Potential Dust Grains in the Interplanetary and Interstellar Media*, AOGS, Singapore, 2005
- Mapping the Solar Wind Outflow in the Inner Corona with UVCS*, AOGS, Singapore, 8 July 2004
- Sun, Wind and Dust*, Institute for Astronomy, The University of Hawaii, 15 December 2003
- Origin of the Solar Wind and Open Coronal Magnetic Structures*, IAUX XV-S219, Sydney, 25 July 2003
- On the Co-existence of a Radial and a Non-radial Component of the Magnetic Field in the Corona*, Solar Polarization Workshop 3, Tenerife, October 2002
- Characteristics of the Slow Solar Wind at Solar Minimum and Maximum*, Solar Wind X International Conference, Pisa, June 2002
- The Solar Wind at Solar Maximum and its Origin at the Sun*, UK MIST/Solar Physics Meeting, Sheffield, April 2002
- Transition from the fast to the Slow Solar Wind at Solar Maximum in the inner corona*, Royal Astronomical Society Meeting, London, January 2002
- On the Predominance of the Radial Component of the Coronal Magnetic Field*, Department of Earth and Space Sciences, University of Science and Technology of China, Hefei, September 4, 2001.
- The Sun and the Solar Wind: an invisible link*, IAGA-IASPEI, Hanoi, August, 2001
- The Source and Characteristics of the Solar Wind: Observations and Theory*
UK Solar Physics Meeting, Cambridge, UK, April 4, 2001.
- A Non-conformist View of the Solar Wind and its Origin*, Institut d'Astrophysique Spatiale, Orsay, October, 2000.

- Origin and Evolution of the Solar Wind*, Cambridge Workshop on Space Plasmas, Lisbon, June 1998
- The Solar Probe Mission*, Spring AGU, Boston, May 1998.
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- New Understanding of the Solar Wind: the Impact of Ulysses and SOHO Measurements*, AAS, Baltimore, January 1998.
- Origins of the Slow and the Ubiquitous fast solar wind*, MIT Space Physics colloquium, November 1997.
- New Perspectives on the Solar Wind*, Boston University Colloquium, October 1997.
- Origins of the Fast Solar Wind*, 18th NSO/Sacramento Peak Workshop, September, 1997.
- Scientific Basis for a Solar Probe Mission Close to the Sun*, SPD meeting, Bozeman, Montana, June 1997.
- Scientific Basis for a Solar Probe Mission close to the Sun*, AGU meeting, *EOS Trans. AGU*, 78(17), Spring Meet. Suppl., S255, 1997.
- Polar Plumes, Open and Closed Fields and the Solar Wind* ISSI Workshop, Bern, Switzerland, July 8-12, 1996.
- Coronal Imaging from the Solar Probe*, XXI General Assembly of the European Geophysical Society, The Hague, The Netherlands, May, 1996.
- Impact of Ulysses observations on solar wind models*, AGU Fall meeting, San Francisco, December, 1995.
- Probing the Acceleration Region of the Solar Wind: Observational Techniques and Models*, Colloquium at the High Altitude Observatory, Boulder, March, 1995.
- Inferences of Coronal Hole Plasma Parameters from Observations*, IAU colloquium 154, Pune, India, January, 1995.
- Coordinated Ground and Space-Based Observations, and the Modeling of the Solar Wind*, AGU Fall meeting, San Francisco, December, 1994.
- Modeling Efforts in the Solar Corona*, First Spartan Workshop, Goddard Space Flight Center, MD, March, 1994.
- Coordinated Ground-Based Observations*, First Spartan Workshop, Goddard Space Flight Center, MD, March, 1994.
- Plasma Parameters inferred from Coordinated Observations*, IACG Workshop, Easton, MD, January, 1994.
- The Different Manifestations of Solar Activity*, *Physics Colloquium*, University of New Hampshire, Durham, November, 1993.
- Temperature Structure, Spatial Structure and Variability of Emission from the Solar Corona*, Monthly Meeting of the Amateur Telescope Makers of Boston, Cambridge, Massachusetts, November, 1993.
- Characteristic Signatures of Solar Activity from the Small Scale Magnetic Field*, The 8th Cambridge Workshop on Cool Stars, Stellar Winds and the Sun, Athens, Georgia, October, 1993.

- Small Scale Structures in the Solar Corona*, Second SOHO Workshop, Elba, Italy, September, 1993.
- Unraveling Some of the Puzzles of Coronal Heating*, Harvard-Smithsonian Center for Astrophysics Colloquium, March 11, 1993.
- Observational Characteristics of Coronal Heating Mechanisms*, University of Cincinnati Physics Colloquium, January 28, 1993.
- The Small Scale Magnetic Field of the Sun and its Connection to Coronal Heating*, Physics Colloquium, U. Mass, Dartmouth, November, 1992.
- Observational Characteristics of Solar Activity in Small-Scale Magnetic Structures*, Gordon Research Conference, Plymouth, New Hampshire, July, 1992.
- Activity in the Quiet Sun*, Physics Colloquium, Rensselaer Polytechnic Institute, April, 1992.
- Coronal Energy Distribution and X-ray Activity in the Small-Scale Magnetic Field*, European Geophysical Society XVI General Assembly, Wiesbaden, Germany, April, 1991.
- Variable EUV Emission in the Quiet Sun and Coronal Heating*, Solar Wind VII Conference, Goslar, Germany, September, 1991.
- Characteristics of the Quiet Sun EUV Emission: New Results from 'Old' (1973) Skylab Data*, University of Oslo, Norway, November, 1990.
- Characteristics of the Variable Quiet Sun EUV Emission*, The Auroral Observatory, University of Tromso, Norway, November, 1990.
- Observations of Coronal Bright Points and Implications for Coronal Heating Mechanisms*, Conference on Mechanisms of Chromospheric and Coronal Heating, Heidelberg, Germany, June, 1990.
- Spatial and Temporal Evolution of Solar Coronal Bright Points Observed Simultaneously at Radio and Optical Wavelengths*, Coronal and Prominence Plasmas Meeting, Berkeley Springs, Virginia, April, 1986.
- Spatial and Temporal Evolution of Solar Coronal Bright Points Observed with the VLA*, Coronal and Prominence Plasmas Meeting, Airlie, Virginia, April, 1985.
- Temporal Evolution of the Solar Wind and the Formation of a Standing Shock*, Naval Research Laboratory, Washington, D.C., June, 1984.
- Heating of Closed and Open Magnetic Field Structures in the Solar Corona by Fast Mode MHD Waves*, University of New Hampshire, Durham, April, 1981.
- Heating of Closed and Open Regions in the Solar Atmosphere by Fast Mode MHD Waves*, University of Tromso, Norway, November, 1980.

PUBLIC LECTURES

The Magic of the Disappearing Sun

Frontiers of Astronomy Community Lecture, University of Hawaii at Manoa
18 November 2009

Total Solar Eclipses: Peering into the Secrets of the Sun

Honolulu Rotary Club, Honolulu, HI
May, 2009

On How to Touch the Sunlight

Damascus Arabic Capital of Culture Lecture on Knowledge, Damascus, Syria
29 October 2008

Following the Trail of the Solar Magnetic Field

Friends of the IfA, Maui, HI
September, 2008

The 2008 Total Solar Eclipse Expedition

Institute for Astronomy Open House, Honolulu, HI
April, 2008

Total Solar Eclipses and the Secrets of the Sun

Maui Maikalani Community Lecture
April 11, 2008

The 2006 Total Solar Eclipse Expedition to the Great Libyan Sahara

The Universe Tonight, Onizuka Center for International Astronomy, Mauna Kea, HI
September, 2006

Highlights from the Total Solar Eclipse Expedition to Libya on 29 March 2006

Institute for Astronomy Open House, Honolulu, HI
April, 2006

Sun-Earth Day

Aberystwyth Art Centre, Aberystwyth, UK,
April, 2003

SOHO 5 Year Celebration

Aberystwyth Art Centre, Aberystwyth, UK,
April, 2001

The Dynamic Sun and the Solar Wind

Center for Astrophysics Summer Seminar Series, Cambridge, MA,
July 16, 1998.

The Solar Wind Sherpas

Center for Astrophysics Women's Program Committee, Cambridge, MA,
June 8, 1998.

Solving Some Solar Enigmas

Boston Museum of Science,
April 15, 1998.

Smithsonian Follows the Sun: From Solar Constant to SOHO

National Air and Space Museum, Einstein Planetarium, Washington, DC,
October 2, 1996.

The Solar Wind: Messenger from the Sun

Center for Astrophysics Summer Seminar Series, Cambridge, MA,
July 20, 1995.

The not so Quiet Sun

Open Night at the Observatory, Cambridge, MA,
August 19, 1993.

LECTURES AT SUMMER SCHOOLS

SPD Summer School *Observations and Models of the Solar wind,* Maui, HI, 10 July 2008

International School of Space Science: Turbulence and Waves in Space Plasmas:
Physics of the Innermost Heliosphere: Plasma Diagnostics and Models, L'Aquila 9-14
September 2007

HiSTAR program *Mighty Magnets on the Sun,* July 2007

PPARC Summer Schools: *The Solar Wind: What can it tell us about the Sun:* University
of Sheffield, 16 September 2003; University of Glasgow, 5 September; Lancaster University,
8 September; University College London, 16 September 2004