

CURRICULUM VITAE

William B. Hubbard

Present position:

Professor, Department of Planetary Sciences and Lunar and Planetary Laboratory,
University of Arizona

Education:

1962 - B.A., Physics, Rice University (*magna cum laude*)

1967 - Ph.D., Astronomy, University of California, Berkeley

Dissertation Title: "Electron Conduction in Degenerate Stellar Matter"

Dissertation Director: L.G. Henyey

Academic and Professional Appointments:

1966, Fellow, Lick Observatory

1967-1968, Postdoctoral Research Fellow, Kellogg Radiation Laboratory,
California Institute of Technology

1968-1972, Assistant Professor of Astronomy, University of Texas at
Austin

1970-1977, Consultant, Jet Propulsion Laboratory, Pasadena, California

1972-1982, Consultant, NASA Headquarters, Washington, DC

1972-1986, Consultant, Lawrence Livermore National Laboratory, Livermore,
California

1972-1975, Associate Professor, Department of Planetary Sciences and Lunar and
Planetary Laboratory, University of Arizona, Tucson, Arizona

1973 National Academy of Sciences Exchange Scientist to the USSR (O. Yu.
Schmidt Institute of Geophysics, Moscow)

1975- , Professor, Department of Planetary Sciences and Lunar and Planetary
Laboratory, University of Arizona, Tucson, Arizona

1977, Acting Director, Lunar and Planetary Laboratory, and Acting Head,
Department of Planetary Sciences, University of Arizona

1978-1981, Director, Lunar and Planetary Laboratory, and Head, Department of
Planetary Sciences, University of Arizona

Memberships:

American Association for the Advancement of Science

American Astronomical Society (Division for Planetary Sciences)

American Geophysical Union

International Astronomical Union

Sigma Xi

Awards and Honors:

1989, Fellow, Japan Society for the Promotion of Science

1991, Fellow, American Geophysical Union

2003, Fellow, American Association for the Advancement of Science

2005, Gerard P. Kuiper Prize in Planetary Sciences, Division for Planetary
Sciences, American Astronomical Society

2010, main-belt asteroid 11216 Billhubbard (1999 JG1)

2012, NASA Group Achievement Award for *Juno* proposal

2012, NASA Group Achievement Award for *Juno* development, launch, and early
operations

2013, Blitzer Award for Excellence in the Teaching of Physics and Related Sciences, University of Arizona

Professional Service:

1971-1972, Science Advisory Group on Outer Solar System Exploration, NASA
1972-1973, Outer Planets Science Working Group, NASA
1973, 1974, Jupiter-Uranus Science Advisory Group, NASA
1973-1975, Interchange participant, Ames Research Center
1977-1980, Member, *Icarus* Editorial Board
1978, Shuttle-Salyut Payload Study Group, NASA
1980-2003, Associate Editor, *Icarus*
1984-1985, Nomination committee, Kuiper and Urey awards of the Division for Planetary Sciences, American Astronomical Society
1986-1988, Member, Division for Planetary Sciences Committee
1989-1990, Member, Planetary Panel, Astronomy and Astrophysics Survey Committee, National Research Council
1991-1996, Member, Outer Planets Science Working Group, NASA
1994-1996, Chairman, Outer Planets Science Working Group, NASA
1996-1998, Chairman, Astrophysical Analogs Campaign Strategy Working Group, NASA
1994-1998, Member, Solar System Exploration Subcommittee, NASA
1998-2001, Member, Electorate Nominating Committee, Astronomy, AAAS (Chair, 2000)
2000, Group Chief, Planetary Astronomy Review Panel, NASA
2001, *ad hoc* member, Core Writing Committee, NASA Planetary Astronomy Program
2003-2006, member, Committee on Planetary and Lunar Exploration (COMPLEX), NAS-NRC
2004-2006, member, Steering Committee, Outer Planets Advisory Group, NASA
2005-2010, Receiving Editor, *New Astronomy* (Elsevier)
2005-, Co-Investigator, *Juno* (NASA Jupiter orbiter mission)
2003-2006, Member, IAU Working Group on Extrasolar Planets
2006-2015, Member, IAU Commission 53 on Extrasolar Planets
2015-, Member, IAU Commission C.F2 on Exoplanets and the Solar System
2007, Member, Cassini Extended Mission Senior Review Board
2008-2009, Prize Subcommittee, Division for Planetary Sciences, American Astronomical Society
2009, Atmospheres Panel Chair, NASA Cassini Data Analysis Program
2009-2010, Member, Giant Planets Panel, Decadal Survey of Astronomy and Astrophysics, NAS-NRC

Major Fields of Research:

Planetary interiors, high pressure physics, structure of rotating planets, stellar structure, occultation theory and observation, turbulence, extrasolar giant planets and brown dwarfs.

Publications:

RESEARCH PAPERS IN REFEREED JOURNALS

- [1] Photoelectric Spectrophotometry of Gaseous Nebulae. I. The Orion Nebula, C.R. O'Dell and W.B. Hubbard, *Astrophys. J.*, **142**, 591, 1965.
- [2] Photoelectric Spectrophotometry of Gaseous Nebulae. III. Scattered Light in Three Bright HII Regions, C.R. O'Dell, W.B. Hubbard, and M. Peimbert, *Astrophys. J.*, **143**, 743, 1966.
- [3] Studies in Stellar Evolution. V. Transport Coefficients of Degenerate Stellar Matter, W. B. Hubbard, *Astrophys. J.*, **146**, 858, 1966.
- [4] Thermal Structure of Jupiter, W. B. Hubbard, *Astrophys. J.*, **152**, 745, 1968.
- [5] Thermal Models of Jupiter and Saturn, W. B. Hubbard, *Astrophys. J.*, **155**, 333, 1969.
- [6] Thermal Conduction by Electrons in Stellar Matter, W.B. Hubbard and M. Lampe, *Astrophys. J. Supplement*, **18**, 297, 1969.
- [7] Hot White Dwarfs, W.B. Hubbard and R.L. Wagner, *Astrophys. J.*, **159**, 93, 1970.
- [8] Structure of Jupiter: Chemical Composition, Contraction, and Rotation, W. B. Hubbard, *Astrophys. J.*, **162**, 687, 1970.
- [9] Statistical Mechanics of Light Elements at High Pressures. I. Theory and Results for Metallic Hydrogen with Simple Screening, W.B. Hubbard and W.L. Slattery, *Astrophys. J.*, **168**, 131, 1971.
- [10] The Occultation of Beta Scorpii C by Io on 1971 May 14, W. B. Hubbard and 10 other coauthors, *Nature*, **234**, 405, 1971.
- [11] The Occultation of Beta Scorpii by Jupiter and Io. I. Jupiter, W.B. Hubbard, R.E. Nather, D.S. Evans, F.G. Tull, D.C. Wells, G.W. Van Citters, B. Warner, and P. Vanden Bout, *Astron. J.*, **77**, 41, 1972.
- [12] The Occultation of Beta Scorpii by Jupiter and Io. III. Astrometry, W. B. Hubbard and T.C. Van Flandern, *Astron. J.*, **77**, 65, 1972.
- [13] Statistical Mechanics of Light Elements at High Pressure. II. Hydrogen and Helium Alloys, *Astrophys. J.*, **176**, 525, 1972.

- [14] Thermodynamics of Hydrogen-Helium Mixtures at High Pressure and Finite Temperature, W. B. Hubbard, *Phys. of the Earth and Planetary Interiors*, **6**, 65, 1972.
- [15] Observations of Rapid Blue Variables. XI. DQ Herculis, B. Warner, W. Peters, R. Nather, and W.B. Hubbard, *Mon. Not. Roy. Astron. Soc.*, **159**, 321, 1972.
- [16] Solidification of a Carbon-Oxygen Plasma, W. B. Hubbard and G. Loumos, *Astrophys. J.*, **180**, 199, 1973.
- [17] Discrepancies in Measurements of the Jupiter Atmospheric Scale Height, W. B. Hubbard and D. S. Evans, *Nature Phys. Sci.*, **240**, 162, 1972.
- [18] Statistical Mechanics of Light Elements at High Pressure. III. Molecular Hydrogen, W. L. Slattery and W. B. Hubbard, *Astrophys. J.*, **181**, 1031, 1973.
- [19] Observational Constraint on the Structure of Hydrogen Planets, W. B. Hubbard, *Astrophys. J. Lett.*, **182**, 132, 1973.
- [20] Gravitational Field of a Rotating Planet of Unit Polytopic Index, *Astronomicheskii Zhurnal*, **51**, 1052, 1974.
- [21] Significance of Gravitational Moments for Interior Structure of Jupiter and Saturn, W.B. Hubbard, V.N. Zharkov, and V.P. Trubitsyn, *Icarus*, **21**, 147, 1974.
- [22] Inversion of Gravity Data for Giant Planets, W. B. Hubbard, *Icarus*, **21**, 157, 1974.
- [23] Deuterium Enrichment of Metallic Hydrogen, W. B. Hubbard, *Astrophys. J.*, **190**, 223, 1974.
- [24] Tides in the Giant Planets, W. B. Hubbard, *Icarus*, **23**, 42, 1974.
- [25] Structure of the Jovian Envelope from Pioneer 10 Gravity Data, W. B. Hubbard, J. D. Anderson, and W. L. Slattery, *Astrophys. J. Lett.*, **193**, 1149, 1974.
- [26] Interior Structure of Uranus: Critical Measurements for an MJU Mission, *Icarus*, **24**, 285, 1975.
- [27] High Zonal Harmonics of Rapidly Rotating Planets, W. B. Hubbard, W. L. Slattery, and C.L. DeVito, *Astrophys. J.*, **199**, 504, 1975.
- [28] Effect of the Jovian Oblateness on Pioneer 10/11 Radio Occultation, W. B. Hubbard, D. M. Hunten, and A. Kliore, *Geophys. Res. Lett.*, **2**, 265, 1975.
- [29] Effects of Turbulence on Radio-Occultation Scale Heights, W. B. Hubbard and J. R. Jokipii, *Astrophys. J. Lett.*, **199**, L193, 1975.

- [30] Comparison of Geometrical Effects in Radio and Stellar Occultations, W. B. Hubbard, *Icarus*, **26**, 175, 1975.
- [31] Ray Propagation in Oblate Atmospheres, W. B. Hubbard, *Icarus*, **27**, 387, 1976.
- [32] Statistical Mechanics of Light Elements at High Pressure. IV. A Model Free Energy for the Metallic Phase, H. E. DeWitt and W. B. Hubbard, *Astrophys. J.*, **205**, 295, 1976.
- [33] Thermodynamics of a Solar Mixture of Molecular Hydrogen and Helium at High Pressure, W. L. Slattery and W. B. Hubbard, *Icarus*, **29**, 187, 1976.
- [34] Temperature of the Atmosphere of Jupiter from Pioneer 10/11 Radio Occultations, A. Kliore, P. Woiceshyn, and W. B. Hubbard, *Geophys. Res.Lett.*, **3**, 113, 1976.
- [35] DeSitter's Theory Flattens Jupiter, W. B. Hubbard, *Icarus*, **30**, 305, 1977.
- [36] The Jovian Surface Condition and Cooling Rate, W. B. Hubbard, *Icarus*, **30**, 305, 1977.
- [37] Stellar Occultations by Turbulent Planetary Atmospheres: A Heuristic Scattering Model, W. B. Hubbard and J. R. Jokipii, *Icarus*, **30**, 531, 1977.
- [38] Stellar Occultations by Turbulent Planetary Atmospheres: The Beta Sco Events, J. R. Jokipii and W. B. Hubbard, *Icarus*, **30**, 537, 1977.
- [39] Effects of Particle Drift on Cosmic- Ray Transport. I. General Properties, Application to Solar Modulation, J. R. Jokipii, E. H. Levy, and W. B. Hubbard, *Astrophys. J.*, **213**, 861, 1977.
- [40] The Occultation of Epsilon Geminorum by Mars: Analysis of McDonald Data, W. B. Hubbard and 9 coauthors, *Astrophys. J.*, **214**, 934, 1977.
- [41] Turbulent Scattering in an Exponential Atmosphere: A Wave-Optical Model, W. B. Hubbard and J. R. Jokipii, *Astrophys. J.*, **214**, 924, 1977.
- [42] Possible Flyby Measurements of Galilean Satellite Interior Structure, W. B. Hubbard and J. D. Anderson, *Icarus*, **33**, 336, 1978.
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- [44] Observations of Uranus Occultation Events, W. B. Hubbard, G. Coyne, T. Gehrels, B. Smith, and B. Zellner, *Nature*, **268**, 33, 1977.

- [45] Stellar Occultations by Turbulent Planetary Atmospheres: A Wave-Optical Theory Including a Finite Scale Height, W. B. Hubbard, J. R. Jokipii, and B. A. Wilking, *Icarus*, **34**, 374, 1978.
- [46] Comparative Thermal Evolution of Uranus and Neptune, *Icarus*, **35**, 177, 1978.
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- [54] Interior Structure of Saturn Inferred from Pioneer 11 Gravity Data, W. B. Hubbard, J. J. MacFarlane, J. D. Anderson, G. W. Null, and E. D. Biller, *J. Geophys. Res.*, **85**, 5909, 1980.
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- [63] Two- and Three-Layer Models of Uranus, G. P. Horedt and W. B. Hubbard, *The Moon and Planets*, **29**, 229, 1983.
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- [67] Low-Frequency Electric Microfield Distributions in Plasmas, C. A. Iglesias, H. E. DeWitt, J. L. Lebowitz, D. MacGowan, and W. B. Hubbard, *Phys. Rev. A.*, **31**, 1698, 1985.
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- [70] Evolution and Infrared Spectra of Brown Dwarfs, J. I. Lunine, W. B. Hubbard and M. S. Marley, *Astrophys. J.*, **310**, 238, 1986.
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- [73] Oblateness, Radius, and Mean Stratospheric Temperature of Neptune from the 20 August 1985 Occultation, W. B. Hubbard, P. D. Nicholson, E. Lellouch, B. Sicardy, A. Brahic, F. Vilas, P. Bouchet, R. A. McLaren, R. L. Millis, L. H. Wasserman, J. H. Elias, K. Matthews, J. D. McGill, and C. Perrier, *Icarus*, **72**, 635, 1987.
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- [76] Thermodynamics of Dense Molecular Hydrogen-Helium Mixtures at High Pressure, M. S. Marley and W. B. Hubbard, *Icarus*, **73**, 536, 1988.
- [77] No Effects of Diffraction on Pluto - Charon Mutual Events, D. J. Tholen and W. B. Hubbard, *Astronomy and Astrophysics*, **204**, L5, 1988.
- [78] Optimized Jupiter, Saturn, and Uranus Interior Models, W. B. Hubbard and M. S. Marley, *Icarus*, **78**, 102, 1989.
- [79] The Effect of Grain Formation on the Cooling of Brown Dwarfs, J. I. Lunine, W. B. Hubbard, A. S. Burrows, and Y. P. Wang, *Astrophys. J.*, **338**, 314, 1989.
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- [81] Theoretical Models of Very Low Mass Stars and Brown Dwarfs, A. S. Burrows, W. B. Hubbard, and J. I. Lunine, *Astrophys. J.*, **345**, 939, 1989.
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