

ROBERT E. JOHNSON

Material Science and Astronomy Departments
Thornton Hall B102
University of Virginia
Charlottesville, VA 22904
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Degrees:

Honorary Doctorate	Uppsala University, Sweden, 1999
Ph.D. (Physics)	University of Wisconsin, 1968
M.A. (Physics)	Wesleyan University, 1963
B.A. (Mathematics)	Colorado College, 1961

Experience:

John Lloyd Newcomb Chair in Engineering Physics and Materials Science 1991—

Head of Engineering Physics at the University of Virginia, 1984 – 2004

Professor of Engineering Physics, University of Virginia, 1984--

Assistant Dean, School of Engineering and Applied Science, University of Virginia, 1982-1985

Associate Professor of Engineering Physics, University of Virginia, 1977-1984

Assistant Professor of Engineering Physics, University of Virginia, 1971-1977

Assistant Professor of Physics, Southern Illinois University, 1969-1971.

Research Fellow, The Queen's University of Belfast, Department of Applied Mathematics and Theoretical Physics, Belfast, Northern Ireland, 1968-1969.

Research Fellow, Woods Hole Oceanographic Institute, 1963-1964.

Honors

Fellow of the American Geophysical Union (Planetary Physics) 2006

Honorary Doctorate Uppsala University (Work on Sputtering) 1999

Fellow of the Bohmische Physickalische Geseellschaft (Surface Physics) 1989

Mac Wade Award for Outstanding Service to the School of Engineering 1989

Visiting Appointments:

Visiting Professor Physics Department NYU, Fall 2007; 2004-2005

Visiting Scientist, Observatoire Midi-Pyrenees Toulouse, summer 2001

NRC Visiting Professor, Goddard Institute for Space Studies/ Columbia, 1997-98

Visiting Professor, University of Paris, Orsay, 1997

Visiting Professor, Rockefeller University, 1991 - 1992

Visiting Professor, University of Catania, Italy, 1987

Visiting Professor, University of Uppsala, Uppsala Sweden, 1987-1995.

Visiting Researcher, Jet Propulsion Laboratory, Pasadena, CA, January 1986

Visiting Professor, Planetary Geoscience Division, University of Hawaii, 1986

AT&T Bell Laboratories, Murray Hill, NJ, 1985

Enrico Fermi Institute, University of Chicago, Argonne National Laboratories
1981-1982

Center for Earth and Planetary Physics, Harvard University, 1977-1978.

NATO Fellow, University of Copenhagen, Denmark, 1976.

Denver University, Department of Physics, 1970.

Professional Societies:

American Institute of Physics, American Geophysical Union, American
Astronomical Society

Research: R. E. Johnson

Interactions of Photons, Ions and Electrons with Gases and Solids:

Theory and Simulations

Topics

Applications to Space Science:

Evolution of Planetary Atmospheres: Mars, Titan, Io

Production of Gas over Planet Surfaces: Moon, Mercury, Europa, Enceladus
Alteration of Planetary Surfaces: Moons of Outer Planets
Alterations of Interstellar Grains
Application to Mass Spectrometry of Biomolecules:
Simulation of Ejecta for Instruments for Sample Analysis
Cross Sections for Ion-Molecule Collisions

Group

3 PhD Students, 1 Postdoctoral Fellow

Grants

PI

NSF Astronomy
Cassini Mission to Saturn NASA/ SwRI
Planetary Atmosphere Program NASA
Planetary Geology and Geophysics NASA
Outer Planet Research Program NASA
Origins of the Solar System NASA

Co-I

2 grants: Planetary Atmosphere Program NASA
Mars Scout Mission (1 of 2 Finalists)

Institutional Interactions

Goddard Space Flight Center
Jet Propulsion Laboratory
Langley Research Center
Southwest Research Institute
NYU Physics
A number of other Universities

Publications

Monographs: 2
Chapters/ Reviews: 32
Referred Journal Papers: 366

Publications: Robert E. Johnson (www.people.virginia.edu/~rej/)

Monographs (2)

Johnson, R.E., Energetic Charged Particle Interaction with Atmospheres and Surfaces, Springer-Verlag, Berlin (1990)

Johnson, R.E., An Introduction to Atomic and Molecular Collisions, Plenum Press, New York (1982)

Chapters/ Reviews (25)

Johnson, R.E., "Photolysis and Radiolysis of Water Ice", Chapter 10 in *Physics and Chemistry at Low Temperatures*, L. Khriachtchev (Ed.) , World Scientific, Singapore, Published by Pan Stanford Publishing Pte. Ltd. (2011). pp297-339.

Carlson, R.W., W.M. Calvin, J.B. Dalton, G.B. Hansen, R.L. Hudson, R.E. Johnson, T.B. McCord and M.H. Moore, "Europa's Surface Composition", Chapter in *Europa*, Ed R. Pappalardo et al. pp283-327(2009).

Cuzzi, J., R. Clark, G. Filacchione, R. French, R. Johnson, E. Marouf, and L. Spilker, "Ring Particle Composition and Size Distribution", Chapter 15 in *Saturn from Cassini-Huygens* (ed. M.K. Dougherty) pp459-509 (2009).

Johnson, R.E., O.J. Tucker, M. Michael, E.C. Sittler, H.T. Smith, D.T. Young, and J.H. Waite, "Mass Loss Processes in Titan's Upper Atmosphere", Chapter 15 in *Titan from Cassini-Huygens* (eds. R.H. Brown et al.) pp373-391, (2009).

Johnson, R.E., M.H. Burger, T.A. Cassidy, F. Leblanc, M. Marconi, W.H. Smyth, "Composition and Detection of Europa's Sputter-Induced Atmosphere", Chapter in *Europa*, Eds. R. Pappalardo et al. pp507-527 (2009).

Mauk, B.H., D.C. Hamilton, T.W. Hill, G.B. Hospodarsky, R.E. Johnson, C. Paranicas, E. Roussos, C.T. Russell, D.E. Shemansky, E.C. Sittler, R.M. Thorne, "Fundamental Plasma Processes in Saturn's Magnetosphere", Chapter 11 in *Saturn from Cassini-Huygens* (ed. M.K. Dougherty) pp 281-331 (2009).

Paranicas, C., J.F. Cooper, H.B. Garret, R.E. Johnson, and S.J. Sturinet, "Europa's radiation environment and its effects on the surface", Chapter in *Europa*, Eds. R. Pappalardo et al. pp529-544 (2009).

Lammer, H., J.F. Kasting, E. Chassefiere, R.E. Johnson, Y.N. Kulikov, F. Tian, "Atmospheric Evolution of Terrestrial Planets and Satellites". (2008) in press.

Johnson, R.E., et al., "Composition and Detection of Europa's Sputter-Induced Atmosphere", Chapter 20 in *Europa*, Eds. R. Pappalardo et al. (2008) in press.

Fox, J.L., M.I. galand, R.E. Johnson, "Solar and Electronic Particle Energy Deposition in Planetary Atmospheres", Chapter in *Comparative Aeronomy, Space Science Reviews* (2008) in press.

Johnson R.E. et al., "Exospheres and Atmospheric Escape", Chapter in Comparative Aeronomy, Ed. A. Nagy (2008) in press.

Johnson, R.E., R.W. Carlson, J.F. Cooper, C. Paranicas, M.H. Moore, and M.C. Wong, "Radiation Effects on the Surface of the Galilean Satellites" in Jupiter-The Planet, Satellites and Magnetosphere, ed. F. Bagenal, T. Dowling, W.B. McKinnon, Cambridge Univ. Press, Cambridge, Chapter 20, p. 485-512(2004)

McGrath, M.A., E. Lellouch, D.F. Strobel, P.D. Feldman, and R.E. Johnson, "Satellite Atmospheres" in Jupiter-The Planet, Satellites & Magnetosphere, eds. F. Bagenal, T. Dowling, W.B. McKinnon, Cambridge Univ. Press, Cambridge. Chap.19, p.457-483 (2004)

Young, D.T., et al. "Cassini Plasma Spectrometer Investigation" in Space Science Reviews doi: 10.1007/s11214-004-1406-4 (2004)

Bringa, E.M. and R.E. Johnson, "Ion Interaction with Solids: Astrophysical Applications", in Solid State Astrochemistry, eds. V. Pirronello and J. Krelowsky, Kluwer, Netherlands, pp 357-393 (2003)

Johnson, R.E., "Surface Boundary Layer Atmospheres", Chapter in Atmospheres in the Solar System: Comparative Aeronomy Geophysical Monograph 130, pp. 203- 219 (2002)

Mukai, T., J. Blum, A.M. Nakamura, R.E. Johnson, O. Havnes, "Physical Processes on Interplanetary Dust" in Interplanetary Dust, ed. E. Grun et al. Springer, Berlin, p. 445-507 (2002)

Madey, T.E., R.E. Johnson and T.M. Orlando, "Far-out Surface Science: Radiation-Induced Surface Processes in the Solar System," Surface Science 500, 838-858 (2002)

Blanc, M. et al., "Magnetospheric and plasma science with Cassini-Huygens" in Space Science Revs. 104, 253-346 (2002)

Cooper, J.F., et al., "Europa exploration : Science and Mission Priorities", in The Future of Solar System Exploration 2003- 2013, NRC Solar System Exploration Decadal Survey, ASP Conference Series, 272, ed. M. Sykes, p. 217-252, Astron. Soc. of the Pacific (2002)

Johnson, R.E., "Surface Chemistry in the Jovian Magnetosphere Radiation Environment", in Chemical Dynamics in Extreme Environments, ed. R.Dessler, Adv.Ser. In Phys. Chem. World Scientific, Singapore, 11,Chap. 8, 390- 419 (2001)

Johnson, R.E., "Sputtering and Desorption from Icy Satellite Surfaces" in Solar System Ices, ed, B. Schmitt and C. beBergh, Kluwer Acad. Pub., Netherlands, p. 303-334 (1998)

Johnson, R.E., "Models for Matrix Assisted Laser Desorption and Ionization: MALDI"; Large Ions: Their Vaporization, Detection and Structural Analysis (ed. T. Baer, C.Y. Ng

and I. Powis) (J. Wiley and Sons, N.Y) p. 49-77 (1996)

Johnson, R.E. "Plasma-induced Sputtering of an Atmosphere" in *Space Science Reviews* 69 215-253 (1994)

Johnson, R.E. "Sputtering of an Atmosphere" in *Trends in Geophys. Res.* 2, p.501- 513 (1993)

Johnson, R.E. and J. Schou "Sputtering of Inorganic Insulators" in *Fundamental Processes in The Sputtering of Atoms and Molecules* (ed. P. Sigmund) *Mat-fys. Medd* 43 Mem (Roy. Dan. Soc., Copenhagen) p. 403-494 (1993)

Johnson, R. E., "Atomic and Molecular Collisions," in *Encyclopedia of Science and Technology*, Vol. 2, p. 223 (1986) Updated and reprinted: p. 309-337 (1992)

Strazzulla, G., and Johnson, R. E., "Irradiation Effects on Cometary Materials and Debris," in *Comets in the Post Halley Era*, Kluewer, Dordrecht, p. 243-276 (1991).

Johnson, R.E., "Irradiation of Solids: Theory" in *Solid-State Astrophysics Enrico Fermi Series*, eds. G. Strazzulla and E. Bussoletti, p. 129-168 (1991)

Sundqvist, B.U.R., Hakansson, P., Hedin, A., Fenyö, D., Brinkman, G., Roepstorff, P., and Johnson, R. E., "Plasma Desorption Mass Spectrometry: Achievements and Frontiers," in *Methods and Mechanisms for Producing Ions from Large Molecules.* eds. K.G. Standing and W. Ens, p. 7-19 (1991)

Cheng, A. F., Johnson, R. E., "Magnetospheric/Satellite Interactions," in *Origins and Evolution of Planetary and Satellite Atmospheres.* Univ. Arizona Press, Tucson, p. 682-722 (1989)

Cheng, A. F., Haff, P. K., Johnson, R. E., and Lanzerotti, L. J., "Interactions of Planetary Magnetospheres with Icy Satellite Surfaces," in *Natural Satellites.* Univ. Arizona Press, Tucson, p. 403-436 (1986).

Johnson, R. E., and Boring, J., Chap. 2 "Charge Transfer Collisions," in *Collision Spectroscopy* ed. Cook, G., Plenum Press, NY (1978)