PAUL F. GOLDSMITH

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Curriculum Vitae

Citizenship: USA

EDUCATION

American School of Paris, France	High School Diploma 1965
University of California, Berkeley	A.B. (Physics) 1969
University of California, Berkeley	Ph.D. (Physics) 1975

POSITIONS HELD

2016 -	JPL–Caltech Technology Liason
2015 -	Supervisor, Group 3266, Evolution of the Universe, JPL
2014 - 2015	Technology Liason, Keck Institute for Space Studies, Calif. Inst. Technology, Pasadena
2009 -	Adjunct Professor of Astronomy, University of Arizona, Tucson
2008 - 2015	Chief Technologist, Astronomy and Physics Directorate, Jet Propulstion Laboratory
2006 -	Senior Research Scientist, Jet Propulsion Laboratory
	Visiting Associate, Department of Astronomy, Calif. Inst. Technology, Pasadena
2006 - 2017	NASA Project Scientist, Herschel Space Observatory
2006 - 2008	Supervisor, Group 3266, Evolution of Galaxies, JPL
2005 - 2006	Principal Scientist, Jet Propulsion Laboratory, Calif. Inst. Technology, Pasadena
2005 -	Professor Emeritus of Astronomy, Cornell University
2000,2001,2004	Professeur Invité, Ecole Normale Supérieure, Paris, France
1999 - 2005	James Weeks Professor in the Physical Sciences, Department of Astronomy, Cornell University
1993 - 2002	Director, National Astronomy and Ionosphere Center
1993 - 2005	Professor, Department of Astronomy, Cornell University
1986 - 1992	Professor, Dept. of Physics & Astronomy, University of Massachusetts, Amherst
1982 - 1992	Vice President of Research and Development, Millitech Corporation
1981 - 1986	Associate Professor, Dept. of Physics & Astronomy, Univ. of Massachusetts, Amherst
1980 - 1992	Associate Director, Five College Radio Astronomy Observatory
1977 - 1980	Consultant, Lincoln Laboratory, Lexington, Massachusetts
1977 - 1979	Resident Visitor, Bell Laboratories, Holmdel, New Jersey
1977 - 1981	Assistant Professor, Dept. of Physics & Astronomy, Univ. of Massachusetts, Amherst
1975 - 1977	Member Technical Staff, Bell Laboratories, Crawford Hill Laboratory, New Jersey
1971 - 1975	Research Assistant, Dept. of Physics, University of California, Berkeley
1969 - 1970	Research Physicist, Lawrence Radiation Laboratory, Berkeley, California

HONORS AND AWARDS

Kenneth J. Button Prize, International Society of Infrared, Millimeter, and Infrared Waves, 2020
NASA Exceptional Scientific Achievement Medal, 2012, 2020
Edward Stone Award for Outstanding Research Publication, 2012
NASA Group Achievement Award, 2010
NASA Exceptional Achievement Medal, 2010
James Weeks Professor in the Physical Sciences, Cornell University, 1999
IEEE Microwave Theory & Techniques Society - Distinguished Lecturer, 1992
Fellow, Institute of Electrical and Electronics Engineers, 1991

NATIONAL & INTERNATIONAL COMMITTEE SERVICE

Joseph Weber Award for Astronomical Instrumentation Committee, American Astronomical Society, 2003-2005

Chair, Scientific and Technical Advisory Committee for Large Millimeter Telescope (LMT) University of Massachusetts, Amherst, and INAOE (Mexico), 1994 -

PUBLICATIONS

Refereed Articles

"Collisional Excitation of Carbon Monoxide in Interstellar Clouds," Goldsmith, P.F., Ap.J., 176, 597, 1972.

"Measurement of Atmospheric Attenuation at 1.3 and 0.87 mm with an Harmonic Mixing Radiometer," Goldsmith, P.F., Plambeck, R., and Chiao, R., IEEE Trans. Microwave Theory Tech., MTT-22, 1115, 1974.

"Observations of the J = 2–1 Transition of Carbon Monoxide in Interstellar Clouds," Goldsmith, P.F., Plambeck, R., and Chiao, R., Ap.J., 196, L39, 1975.

"Observations of the $^{12}C/^{13}C$ Ratio in Four Galactic Sources of Formaldehyde," Matsakis, D., Chui, M., Goldsmith, P.F., and Townes, C.H., Ap.J. (Lett.), 206, L63, 1976.

"A 230 GHz Radiometer System Employing a Second Harmonic Mixer," Goldsmith, P.F., and Plambeck, R., IEEE Trans. Microwave Theory Tech., MTT-24, 859, 1976.

"Rotational Excitation of Molecules by Electrons in Interstellar Clouds," Dickinson, A.S., Phillips, T.G., Goldsmith, P.F., Percival, I.C., and Richards, D., Astron. Astrophys., 54, 645, 1977.

"Comparison of J = 2–1 and J = 1–0 Spectra of CO in Molecular Clouds," Plambeck, R., Williams, D.R.W., and Goldsmith, P.F., Ap.J. (Lett.), 213, L41, 1977.

"Isotopic Abundance Variations in Interstellar HCN," Linke, R.A., Goldsmith, P.F., Wannier, P.G., Wilson, R.W., and Penzias, A.A., Ap.J., 214, 50, 1977.

"A Quasioptical Feed System for Radioastronomical Observations at Millimeter Wavelengths, Goldsmith, P.F., B.S.T.J., 56, 1483, 1977.

"Molecular Cooling and Thermal Balance of Dense Interstellar Clouds," Goldsmith, P.F. and Langer, W.D., Ap.J., 222, 881, 1978.

"Carbon Monoxide Mixing Ratio in the Mesosphere Derived From Ground-Based Microwave Measurements," Goldsmith, P.F., Litvak, M.M., Plambeck, R.L., and Williams, D.R.W., J. Geophys. Res., 84, 416, 1979.

"Microwave Radiometer Blackbody Calibration Standard for Use at Millimeter Wavelengths," Goldsmith, P.F., Kot, R.A., and Iwasaki, R.S., Rev. Sci. Instrum., 50(9), 1120, 1979.

"Tunable Submillimeter Sources Applied to Excited State Rotational Spectroscopy and Kinetics of CH_3F," Blumberg, W., Fetterman, H., Goldsmith, P.F., and Peck, D., Appl. Phys. Lett., 35(8), 1979.

"Evidence for Isotopic Fractionation of Carbon Monoxide in Dark Clouds," Langer, W.D., Goldsmith, P.F., Carlson, E.R., and Wilson, R.W., Ap.J. (Lett.), 235, L39, 1980.

"Observations of Interstellar Carbon Monosulfide – Evidence for Turbulent Cores in Giant Molecular Clouds," Linke, R.A. and Goldsmith, P.F., Ap.J., 235, 437, 1980.

"Baseline Ripple Reduction by Quasi–Optical Phase Modulation," Goldsmith, P.F. and Scoville, N.Z., Astron. Astrophys., 82, 337, 1980.

"High Angular Resolution Observations of CS in the Orion Nebula," Goldsmith, P.F., Langer, W.D., Schloerb, F.P., and Scoville, N.Z., Ap.J., 240, 524, 1980.

"A Quasi–Optical Single Sideband Filter Employing a Semiconfocal Resonator," Goldsmith, P.F. and Schlossberg, H., IEEE Trans. Microwave. Theory. Tech., MTT-28, 1136, 1980.

"CO Abundance and Isotopic Fractionation in Dark Clouds," Goldsmith, P.F., Langer, W.D., Carlson, E.R., and Wilson, R.W., Proc. IAU Symposium 87: Interstellar Molecules, B.H. Andrew, ed., Dordrecht: Reidel, 417, 1980.

"Molecular Cloud Densities from Observations of Carbon Mono- sulfide," Linke, R.A. and Goldsmith, P.F., Proc. IAU Symposium 87: Interstellar Molecules, B.H. Andrew, ed., Dordrecht: Reidel, 117, 1980.

"A Cooled Schottky-Diode Mixer for 75–120 GHz," Raisanen, A.V., Predmore, C.R., Parrish, P.T., Marrero, J.L., Goldsmith, P.F., Kot, R.A., and Schneider, M.V., Proc. 10th European Microwave Conference, Warsaw, Poland, Sept., 1980.

"Groundbased Heterodyne Observation of CO at 691 GHz," Koepf, G.A., Fetterman, H.R., Goldsmith, P.F., Clifton, B.J., Buhl, D., Erickson, N.R., McAvoy, N., and Tannenwald, P.E., Proc. Fifth Int'l. Conf. IR and MM Waves, Wurzburg, 189, 1980.

"A Study of Interstellar Carbonyl Sulfide," Goldsmith, P.F. and Linke, R.A., Ap.J., 240, 524, 1980.

"Detection of the J = 6–5 Transition of Carbon Monoxide," Goldsmith, P.F., Erickson, N.R., Fetterman, H.R., Clifton, B.J., Peck, D.D., Tannenwald, P.E., Koepf, G.A., Buhl, D., and McAvoy, N., Ap.J.(Lett.), 243, L79, 1981.

"A Determination of the Carbon and Oxygen Isotopic Ratios in the Local Interstellar Medium," Wilson, R.W., Langer, W.D., and Goldsmith, P.F., Ap.J.(Lett.), 243, L47, 1981.

"Submillimeter Heterodyne Detection of Interstellar Carbon Monoxide at 434 Micrometers," Fetterman, H.R., Koepf, G.A., Clifton, B.J., Buhl, D., Erickson, N.R., Peck, D.D., Goldsmith, P.F., McAvoy, N., and Tannenwald, P.E., Science, 211, 580, 1981.

"Infrared Pumping and Rotational Excitation of Molecules in Interstellar Clouds," Carroll, T.J. and Goldsmith, P.F., Ap.J., 245, 891, 1981.

"Determination of HNC to HCN Abundance Ratio in Giant Molecular Clouds," Goldsmith, P.F., Langer, W.D., Elder, J., Irvine, W., and Kollberg, E., Ap.J., 249, 524, 1981.

"Cryogenic Operation of Submillimeter Quasioptical Mixers," Goldsmith, P.F., Fetterman, H.R., Clifton, B.J., Parker, C.D., and Erickson, N.R., Int. J. Infrared and MM Waves, 2(5), 915, 1981.

"Coupling of the Magnetic Field and Rotation in the Dark Cloud B5," Young, J.S., Langer, W.D., Goldsmith, P.F., and Wilson, R.W., Ap.J.(Lett.), 251, L81, 1981.

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"Quasioptical Techniques at Millimeter and Submillimeter Wavelengths," Goldsmith, P.F., Ch. 6 of Millimeter and Infrared Waves, K.J. Button, ed. New York: Academic Press, 277, 1982.

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"High Velocity Emission in the Orion Molecular Cloud," Proc. ESTEC Workshop on "The Scientific Importance of Submillimeter Observations," Noordwijkerhout, Holland, 37, 1982.

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"Very Long Baseline Interferometry at a Wavelength of 3.4mm," Readhead, A.C.S., Masson, C.R., Moffet, A.T., Pearson, T.J., Seielstad, G.A., Woody, D.P., Backer, D.C., Plambeck, R.L., Welch, W.J., M.C.H., Rogers, A.E.E., Webber, J.C., Shapiro, I.I., Moran, J.M., Goldsmith, P.F., Predmore, C.R., Baath, L., and Ronnang, B., Nature, 303, 504, 1983.

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"Quasioptical Techniques Offer Advantages at Millimeter Frequencies," Microwave Systems News, 13, 65, 1983.

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"Bipolar Outflows in Dark Clouds," Goldsmith, P.F., Snell, R.L., Hemeon-Heyer, M., and Langer, W.D.," Ap.J., 286, 599, 1984.

"Recent Progress in Quasioptical Techniques at Millimeter and Sub-millimeter Wavelengths," Proc. 9th Infrared and Millimeter Wave Conference, Takarazuka, Japan, October, 491, 1984.

"Technique Allows Measurement of Small Millimeter Antenna Patterns," Goldsmith, P.F., and Moore, E.L., MSN, 14 (No. 13), 59, 1984.

"Search for Molecular Oxygen in Dense Interstellar Clouds," Goldsmith, P.F., Snell, R.L., Erickson, N.R., Dickman, R.L., Schloerb, F.P., and Irvine, W.M., Ap.J., 289, 613, 1985.

"Gaussian Beam Imaging with Cylindrical Optics," Goldsmith, P.F., 1985 International Microwave Symposium, MTT-S Digest, 173, 1985.

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"Density Distributions in Dark Clouds," Arquilla, R. and Goldsmith, P.F., Ap.J., 297, 436, 1985.

"Further Study of Vibrationally Excited Cyanoacetylene in Orion IRc2 and Other Sources," Goldsmith, P.F., Krotkov, R., and Snell, R.L., Ap.J., 299, 40, 1985.

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"Molecular Outflows Associated with IRAS Sources in B5," Langer, W.D., Goldsmith, P.F., and Wilson, R.W., Proc. Haystack Meeting, Masers, Molecules, and Mass Outflows in Star Forming Regions, A.D. Haschick, ed., 169, 1986.

"Holographic Measurements," Goldsmith, P.F. and Erickson, N.R., in Radio Astronomy (2nd edition) by J. Kraus. Powell: Cygnus-Quasar Books, 6-62, 1986.

"Gaussian Beam Transformation with Cylindrical Lenses," Goldsmith, P.F., IEEE Trans. Antennas Propag., AP-34, 603, 1986.

"A Detailed Examination of the Kinematics of Rotating Clouds," Arquilla R. and Goldsmith, P.F., Ap.J., 303, 356, 1986.

"HCN Emission from Bipolar Reflection Nebulae," Deguchi, S., Claussen, M.J., and Goldsmith, P.F., Ap.J., 303, 810, 1986.

"Molecular Outflows, Gas Density Distribution, and the Effects of Star Formation in the Dark Cloud B5," Goldsmith, P.F., Langer, W.D., and Wilson, R.W., Ap.J.(Lett.), 303, L11, 1986.

"Submillimeter Observations of CS in M17," Snell, R.L., Erickson, N.R., Goldsmith, P.F., Ulich, B.L., Lada, C.J., Martin, R.N., and Schulz, A., Ap.J., 304, 780, 1986.

"Solid State Submillimeter Radiometer for Space Applications," P. Goldsmith, N. Erickson, A. Vickery, and N. Deo, Proc. ESA Workshop on a Space-Borne Sub-Millimetre Astronomy Mission, Segovia, Spain, June 1986, 221.

"Models of Molecular Cores II: Multi-transition Study of $C^{34}S$," Mundy, L.G., Snell, R.L., Evans, N.J. II, Goldsmith, P.F., and Bally, J., Ap.J., 306, 670, 1986

"A Study of the Morphology and Kinematics of the Dense Gas Associated with Star Forming Regions," Heyer, M.H., Snell, R.L., Goldsmith, P.F., Snell, R.L., Strom, S.E., and Strom, K.M., Ap.J., 308, 134, 1986.

"Dielectric Wedge Conical Scanned Gaussian Optics Lens Antenna," Goldsmith, P.F. and Gill, G.J., Microwave Journal, 29, 207, 1986.

"Variations in the HCN/HNC Abundance Ratio in the Orion Molecular Cloud," Goldsmith, P.F., Irvine, W.M., Hjalmarson, A., and Ellder, J., Ap.J., 310, 383, 1986.

"1300 Micron Continuum Observations of the Sagittarius B2 Molecular Cloud Core," Goldsmith, P.F., Snell, R.L., and Lis, D.C., Ap.J., 313, L5, 1987.

"Small-Scale Structure and Chemical Differentiation in the Central Region of the Sagittarius B2 Molecular Clouds," Goldsmith, P.F., Snell, R.L., Hasegawa, T., and Ukita, N., Ap.J., 314, 525, 1987.

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"The Vicinity of Omicron Per," Bachiller, R., Cernicharo, J., Goldsmith, P., and Omont, A., Astron. Astrophys., 185, 297, 1987.

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"A Modular Approach to Beam Waveguide – The Optiguide System," Goldsmith, P.F. and Moore, E.M., Proc. 12th IR and MM Waves Conference, Orlando, Florida, 172, 1987.

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"Dense Cores in Dark Clouds: V. CO Outflow," Myers, P.C., Heyer, M., Snell, R.L., and Goldsmith, P.F., Ap.J., 324, 907, 1988.

"1.4MM H_2CO Observations of NGC2071," Tauber, J., Goldsmith, P.F., and Snell, R.L., Ap.J., 325, 846, 1988.

"Linear Polarization of Millimeter–Wave Emission Lines in Clouds Without Large Velocity Gradients," Lis, D.C., Goldsmith, P.F., Dickman, R.L., Predmore, C.R., Omont, A., and Cernicharo, J., Ap.J., 328, 304, 1988.

"Linear Polarization of HCN Maser Emission in CIT 6," Goldsmith, P.F., Lis, D.C., Guilloteau, S., and Omont, A., Proc. Second Haystack Observatory Meeting on Interstellar Molecules, J.M. Moran and P.T.P. Ho, eds., Montreux: Gordon and Breach, 225, 1988.

"A Submillimeter Receiver at 492 GHz," Tauber, J.A., Erickson, N.R., Goldsmith, P.F., and Snell, R.L., Proc. Second Haystack Observatory Meeting Interstellar Molecules, J.M. Moran and P.T.P. Ho, eds., Montreux: Gordon and Breach, 253, 1988.

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