

## CURRICULUM VITAE – July 2017

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### BIOGRAPHICAL

Born: 6 May 1959; Greenville, Mississippi.

Married: Karen L. Blake, 1982. One child, Garrett Alexander Blake, b. March 1988.

### DEGREES

May, 1981 B. S., *summa cum laude*, with distinction in Chemistry, Duke University, Durham, NC (Physics minor). Thesis advisor - Prof. W.L. Luken.

June, 1986 Ph.D., Chemical Physics, California Institute of Technology, Pasadena, CA. Thesis advisor - Prof. T.G. Phillips (Physics).

### PROFESSIONAL HISTORY

6/76-9/76 Summer Research Student, American University and Goddard Space Flight Center, NASA; Greenbelt, Maryland.

Research area: Analysis of airborne and space platform remote sensing measurements of stratospheric ozone profiles.

1/78-9/78 Research Assistant, California Institute of Technology, Pasadena, California. Research area: Recombinant DNA analysis of human  $\delta$  and  $\beta$  globin genes.

6/79-9/79 Summer Research Assistant, University of Washington, Seattle, Washington. Research area: *in vitro* kinetic and audioradiographic studies of the sodium/potassium pump in *rana pipiens*.

6/80-9/80 NSF REU Student, Duke University, Durham, North Carolina. Research area: *ab initio* quantum mechanical studies of the boron trifluoride/carbon monoxide van der Waals dimer.

6/81-9/81 Summer Research Assistant, Jet Propulsion Laboratory, Pasadena, California. Research area: Ion cyclotron resonance studies of ion-molecule reactions involving astrophysically important sulfur-bearing hydrocarbons.

9/81-9/84 NSF Predoctoral Fellow, California Institute of Technology. Thesis research: Laboratory/astronomical rotational and rovibrational spectroscopy of reactive intermediates at THz frequencies.

6/82-9/82 Summer Researcher, Duke University. Research area: Millimeter and submillimeter spectroscopy of transient species, non-invasive plasma diagnostics.

- 9/85-9/87 Miller Basic Research Postdoctoral Fellow, University of California, Berkeley.  
Research areas: Infrared and THz spectroscopy of molecular ions and weakly bonded clusters, THz astrophysics. Advisor - Prof. R.J. Saykally (Chemistry)
- 9/87-7/93 Assistant Professor of Cosmochemistry and Planetary Science, Division of Geological and Planetary Sciences, California Institute of Technology.
- 7/93-7/97 Associate Professor of Cosmochemistry and Planetary Science, Division of Geological and Planetary Sciences, California Institute of Technology.
- 7/97-9/99 Professor of Cosmochemistry and Planetary Science, Division of Geological and Planetary Sciences, California Institute of Technology.
- 7/09-7/14 Caltech Master of Student Houses (MOSH).
- 9/99- Professor of Chemistry, Division of Chemistry and Chemical Engineering, California Institute of Technology.  
Research areas: TeraHertz (THz) high resolution and nonlinear femtosecond coherent control spectroscopy of hydrogen bonded and semiconductor materials; observational analyses of stellar and planetary genesis.

## HONORS AND AWARDS

- 6/77 National Space Club Award for Research.
- 5/80 Phi Lambda Upsilon, Phi Lambda Upsilon Award for Outstanding Rising Senior, NSF REU Student, Duke University.
- 5/81 Phi Beta Kappa, Sigma Xi, *summa cum laude*, Chemistry Department Award for Outstanding Undergraduate Thesis, Duke University.
- 9/81-9/84 NSF Predoctoral Fellow, California Institute of Technology.
- 9/85-9/87 Miller Basic Research Fellow, University of California, Berkeley.
- 9/87-9/88 Boeing Faculty Development Fund, California Institute of Technology.
- 9/87-9/88 IBM Young Faculty Development Fund, California Institute of Technology.
- 9/88-9/93 David and Lucille Packard Fellow, California Institute of Technology.
- 9/89-9/91 Alfred P. Sloan Research Fellow, California Institute of Technology.
- 6/89-6/94 NSF Presidential Young Investigator, California Institute of Technology.
- 6/98-11/98 JILA Visiting Fellow, University of Colorado, Boulder.
- 12/04 Raymond & Beverley Sackler Lecture in Astrophysics, Leiden University.
- 11/08-5/09 Beatrice Tinsley Centennial Visiting Professor in Astronomy, UT Austin.
- 1/15-9/15 KNAW (Dutch Royal Academy of Arts & Sciences) Senior Visiting Professor.

## PROFESSIONAL ACTIVITIES

- 10/89 NASA Workshop on Submillimeter Planning (report available).
- 10/89-7/90 Science with the Millimeter Array Workshop (NSF document available).
- 3/90-8/93 Origins of Solar Systems Review Panel, OSS, NASA.
- 3/91-6/92 Research and Analysis Study Committee, SSED, NASA (report available).
- 8/92-8/95 Solar System Exploration Division Advisory Committee, OSS, NASA.
- 4/92-4/96 Co-Chair, OSA Topical Meetings on High Resolution Spectroscopy.
- 2/96-11/97 Member, Defense Science Study Group, DoD.

6/94-6/97   Origins of Solar Systems MOWG, OSS, NASA.  
 9/97-9/99   Millimeter Advisory Committee, NSF/NRAO Millimeter Array Project.  
 8/98-10/99   Exobiology Program Review Panel, OSS, NASA.  
 6/98-12/99   Panel on Radio & Submillimeter-Wave Astronomy, NAS Astronomy and  
 Astrophysics Decadal Survey Committee  
 9/99-4/03   ALMA Science Advisory Committee (3/01-9/01 Vice Chair, 9/01-3/02 Chair)  
 11/99-7/03   Member, NRAO Visiting Committee  
 1/90-       Project SEED/CAPSI Science Professional, Pasadena Unified District.  
 1/02-11/04   Member, Spitzer Science Center Oversight Committee  
 2/00-6/06   Deputy Director, Owens Valley Radio Observatory  
 9/01-9/06   Member, SOFIA Science Steering Committee  
 7/06-7/10   Faculty Chair, Undergraduate Admissions, Caltech  
 9/11-8/12   Member, NSF Astronomy Portfolio Review Committee

## **HUMAN RESOURCES CONTRIBUTIONS AND RESEARCH COLLEAGUES**

### **Undergraduate Students Supervised (1987-present)**

Ms. Nicole Adelstein (Reed), Ms. Maryam Ali, Mr. Avinash Agrawal, Mr. Brennan Ashwood (Case Western), Mr. Richard Balterzan, Ms. Caryn Bell (UMBC), Mr. Zach Berger, Dr. Suzanne Bisschomp (Leiden), Ms. Catherine Boone, Dr. Janet Bowen, Ms. Gina Buccolo, Mr. Abraham Buditama, Ms. Frances Chance, Mr. Oliver Chen, Ms. Shirley Chen, Dr. Kevin Cossel, Ms. Nadine Curry, Mr. Xander deVries (Njimegen), Ms. Kathryn Dyl, Mr. Jerry Feng, Mr. Luke Finnerty, Mr. Daniel Guth, Mr. Matthew Harrigan, Dr. Thomas Heavey, Ms. Jennifer Herman, Ms. Kristen Holtz, Mr. Marinus Israel (Leiden), Mr. Timothy Jones, Dr. J.B. Khanyille (Richmond), Ms. Stacy Kim, Dr. Ted Koenig, Ms. Janet Lai, Mr. William Lake, Ms. J.-Y. Li, Mr. Benjiman Lin, Prof. Karin Öberg, Mr. Abhijit Puranam, Mr. Noah Rahman, Mr. David Rischer, Ms. Nitzan Roth, Mr. Kevin Sutherland, Ms. Justine Tawel (Carleton), Ms. Jamie Tayar, Ms. Elizabeth Terlinden, Mr. Praful Vasireddy, Dr. Elanor Waxman

### **Graduate Students Supervised (1988-present)**

Dr. Todd Groesbeck (Physics, w/Prof. T.G. Phillips); Dr. Marco A. Allodi, Dr. Rogier Braakman, Mr. Cam Buzard, Mr. P. Brandon Carroll, Dr. Pin Chen, Dr. Ian A. Finneran, Mr. Alexander Froebel, Dr. Jacob T. Good, Dr. Daniel B. Holland, Dr. Vadym Kapinus, Dr. Matthew J. Kelley, Ms. Melissa Kelly (M.S.), Dr. Jacqueline Kessler-Silacci, Dr. Brett A. McGuire, Mr. Griffin Mead, Mr. Michael Morton (M.S), Dr. David Rodham, Dr. Paul Stockman, Dr. Sakae Suzuki, Prof. Susanna Widicus Weaver, Ms. Olivia Wilkins, Dr. Sheng Wu (Chemistry); Ms. Xiaolin Xu (Materials Science); Ms. Dana Anderson, Ms. Masha Kleshcheva, Prof. Mao-Chang Liang (w/Prof. Y.L. Yung), Dr. Alexandra C. Lockwood, Dr. Stuart McMuldroch (w/Prof. A.I. Sargent), Ms. Danielle Piskorz (w/Prof. H. Knutson), Dr. Chunhua Qi, Prof. Colette V. Salyk, Dr. Hui Zhang (w/Prof. P.O. Wennberg, Planetary Science); Mr. Scott Barenfeld (w/Dr. J.M. Carpenter), Dr. Joanna Brown, Ms. Katie Kaufman, Dr. Ke Zhang (Astronomy), Dr. Jiun-Yann Yu (Biological Engineering, w/Prof. C.-L. Guo).

### **Postdoctoral Research Fellows Supervised (1988-present)**

Prof. Roger Bumgarner, Dr. Peter Green, Prof. Shuji Matsuura, Dr. Zulfikar Morbi, Dr. Adwin Boogert, Dr. Nathan Crockett, Prof. Sergio Ioppolo (Curie Fellow), Dr. Rowin Meijerink, Dr. Klaus Pontoppidan (Hubble Fellow), Prof. Rachel Smith Prof. Jim Kubicki (w/Prof. E.M. Stolper), Dr. Zifu Wang (w/Prof. G.R. Rossman), Dr. Thom Rahn (w/Prof. J. Eiler), Dr. Amir Yeganeh-Hauri (w/Prof. T.J. Ahrens), Dr. Franc. Jeanneret (w/Prof. P. Wennberg), Prof. Björn Benneke (w/Prof. H. Knutson)

### **Current & Recent Collaborators**

Prof. E.A. Bergin, University of Michigan – THz spectral line surveys of star-forming molecular clouds, C and N chemistry in circumstellar disks.

Dr. J.M. Carpenter – Millimeter-wave studies of T Tauri and Herbig Ae stars and transitional disks.

Prof. H. Knutson – Direct detection of the molecular signatures of exoplanet atmospheres.

Prof. L.G. Mundy, Univ. of Maryland & Prof. N.J. Evans II, UT Austin – Multi-wavelength continuum and spectral line studies of deeply embedded young stellar objects (YSOs).

Drs. K.M. Pontoppidan, STScI & Prof. C. Salyk, Vassar – Infrared spectroscopy of the planet-forming region of circumstellar disks.

Profs. E.F. van Dishoeck & M.R. Hogerheijde, Leiden University – Observational and theoretical characterization of the chemistry in molecular clouds and YSOs.

Prof. A. Minnich – Ultrafast laser studies of thermal conductivity in nano-structured materials.

## REFEREED PUBLICATIONS

- [1] "The Isolation and Characterization of Linked  $\delta$ - and  $\beta$ -Globin Genes from a Cloned Library of Human DNA" Richard M. Lawn, Edward F. Fritsch, Richard C. Parker, Geoffrey Blake, & Tom Maniatis 1978, *Cell* **15**, 1157.
- [2] "Laboratory Millimeter and Submillimeter Spectrum of  $\text{HOC}^+$ " Geoffrey A. Blake, Paul Helminger, Eric Herbst, & Frank C. De Lucia 1983, *Ap. J.(Letters)* **264**, L69.
- [3] "The Production of Large Concentrations of Molecular Ions in the Lengthened Negative Glow Region of a Discharge" Frank C. De Lucia, Eric Herbst, Grant M. Plummer, & Geoffrey A. Blake 1983, *J. Chem Phys.* **78**, 2312.
- [4] "First Detection of the Ground State  $J_K=1_0 \rightarrow 0_0$  Submm Transition of Interstellar  $\text{NH}_3$ " Jocelyn Keene, Geoffrey A. Blake, & Thomas G. Phillips 1983, *Ap. J.(Letters)* **271**, L27.
- [5] "The Millimeter and Submillimeter Spectrum of CN in its First Four Vibrational States" David D. Skatrud, Frank C. De Lucia, Geoffrey A. Blake, & K.V. Sastry 1983, *J. Mol. Spec.* **99**, 35.
- [6] "The Laboratory Millimeter and Submillimeter Spectrum of HCO" Geoffrey A. Blake, K.V. Sastry, & Frank C. De Lucia 1984, *J. Chem. Phys.* **80**, 95.
- [7] "The Millimeter and Submillimeter Spectrum of Methyl Formate in its Ground Symmetric Torsional State" Grant M. Plummer, Eric Herbst, Frank C. De Lucia, & Geoffrey A. Blake 1984, *Ap. J. Suppl.* **55**, 633.
- [8] "On the Interpretation of the Broad-Band Mm-Wave Flux from Orion" Edward C. Sutton, Geoffrey A. Blake, C.R. Masson, & Thomas G. Phillips 1984, *Ap. J.(Letters)* **283**, L41.
- [9] "Ion-molecule Reactions in Unsaturated Hydrocarbons: Allene, Propyne, Diacetylene, and Vinylacetylene" Vince G. Anicich, Geoffrey A. Blake, Jhong K. Kim, Murray J. McEwan, & Wesley T. Huntress, Jr. 1984, *J. Phys. Chem.* **88**, 4608.
- [10] " $^{13}\text{CH}_3\text{OH}$  in OMC-1" Geoffrey A. Blake, Edward C. Sutton, Colin R. Masson, Thomas G. Phillips, Eric Herbst, Grant M. Plummer, & Frank C. De Lucia 1984, *Ap. J.* **286**, 586.
- [11] "Interaction Optimized Virtual Orbitals III: Single Excitations" William L. Luken, Barbara A.B. Seiders, & Geoffrey A. Blake 1985, *Chem. Phys.* **92**, 255.
- [12] "Generation of Continuously Tunable Laser Sidebands in the Far-Infrared Region" Jam Farhoomand, Geoffrey A. Blake, Margaret A. Frerking, & Herbert M. Pickett 1985, *J. Appl. Phys.* **57**, 1763.
- [13] "Direct Measurement of the Fundamental Rotational Transitions of the OH Radical by Laser Sideband Spectroscopy" Jam Farhoomand, Geoffrey A. Blake, & Herbert M. Pickett 1985, *Ap. J.(Letters)* **291**, L19.
- [14] "Molecular Line Survey of Orion A from 215 and 247 GHz" Edward C. Sutton, Geoffrey A. Blake, Colin R. Masson, & Thomas G. Phillips 1985, *Ap. J. Suppl.* **58**, 341.
- [15] "Interstellar  $\text{H}_3^+$ : Possible Detection of the  $1_{10} \rightarrow 1_{11}$  Transition of  $\text{H}_2\text{D}^+$ " Thomas G. Phillips, Geoffrey A. Blake, Jocelyn Keene, R. Claude Woods, & Ed Churchwell 1985, *Ap. J.(Letters)* **294**, L45.
- [16] "Chlorine in Dense Interstellar Clouds: The Abundance of HCl in OMC-1" Geoffrey A. Blake, Jocelyn Keene, & Thomas G. Phillips 1985, *Ap. J.* **295**, 501.

- [17] "The Abundance of Atomic Carbon Near the Ionization Fronts in M17 and S140" Jocelyn Keene, Geoffrey A. Blake, Thomas G. Phillips, Patrick J. Huggins, & Charles A. Beichman 1985, *Ap. J.* **299**, 967.
- [18] "The Chemistry of Chlorine in Dense Interstellar Clouds" Geoffrey A. Blake, Vince G. Anicich, & Wesley T. Huntress, Jr. 1986, *Ap. J.* **300**, 415.
- [19] "The Far-Infrared Rotational Spectrum of X<sup>2</sup>II OH" Geoffrey A. Blake, Jam Farhoomand, & Herbert M. Pickett 1986, *J. Mol. Spec.* **115**, 226.
- [20] "The Rotational Emission Line Spectrum of Orion A Between 247-263 GHz" Geoffrey A. Blake, E.C. Sutton, C.R. Masson, & Thomas G. Phillips 1986, *Ap. J. Suppl.* **60**, 357.
- [21] "The Millimeter and Submillimeter Spectrum of Methyl Formate in its Antisymmetric Torsional State" Grant M. Plummer, Eric Herbst, Frank C. De Lucia, & Geoffrey A. Blake 1986, *Ap. J. Suppl.* **60**, 949.
- [22] "Direct Measurement of the Fine Structure Interval and  $g_J$  Factors of Singly Ionized Atomic Carbon by Laser Magnetic Resonance" Andrew L. Cooksy, Geoffrey A. Blake, & Richard J. Saykally 1986, *Ap. J. (Letters)* **305**, L89.
- [23] "Excitation of Methyl Cyanide in the Orion Hot Core" Edward C. Sutton, Geoffrey A. Blake, Reinhard Genzel, Colin R. Masson, & Thomas G. Phillips 1986, *Ap. J.* **311**, 921.
- [24] "Determination of the Born-Oppenheimer Potential Function of CCl<sup>+</sup> by Velocity Modulation Diode Laser Spectroscopy" Martin Gruebele, Mark Polak, Geoffrey A. Blake, & Richard J. Saykally 1986, *J. Chem. Phys.* **85**, 6256.
- [25] "Comparison of Submillimeter and UV Observations of Neutral Carbon Towards Zeta Oph" Jocelyn Keene, Geoffrey A. Blake, & Thomas G. Phillips 1986, *Ap. J.* **313**, 396.
- [26] "Determination of the Electric Dipole Moment of ArH<sup>+</sup> by the Rotational Zeeman Effect with a Tunable Far-Infrared Laser" Kenneth B. Laughlin, Geoffrey A. Blake, Ronald C. Cohen, David C. Hovde, & Richard J. Saykally 1987, *Phys. Rev. Lett.* **58**, 996.
- [27] "Molecular Abundances in OMC-1: The Chemical Composition of Interstellar Molecular Clouds and the Influence of Massive Star Formation" Geoffrey A. Blake, Edward C. Sutton, Colin R. Masson, & Thomas G. Phillips 1987, *Ap. J.* **315**, 621.
- [28] "Laboratory Measurements of the Pure Rotational Spectrum of Vibrationally Excited HCO<sup>+</sup> ( $\nu_2 = 1$ ) by Far-Infrared Laser Sideband Spectroscopy" Geoffrey A. Blake, Kenneth B. Laughlin, Ronald C. Cohen, Kerry L. Busarow, & Richard J. Saykally 1987, *Ap. J. (Letters)* **316**, L76.
- [29] "Tunable Far-IR Laser Spectroscopy in a Planar Supersonic Jet: The  $\Sigma$  Bending Vibration of Ar-HCl" Kerry L. Busarow, Geoffrey A. Blake, Kenneth B. Laughlin, Ronald C. Cohen, Yuan T. Lee, & Richard J. Saykally 1987, *Chem. Phys. Lett.* **141**, 289.
- [30] "Determination of the Dipole Moments of Molecular Ions from the Rotational Zeeman Effect by Tunable Far-IR Laser Spectroscopy" Kenneth B. Laughlin, Geoffrey A. Blake, Ronald C. Cohen, David C. Hovde, & Richard J. Saykally 1988, *Phil. Trans. Roy. Soc. London A* **234**, 109-119.
- [31] "Tunable Far-IR Laser Spectroscopy of van der Waals Bonds: Extended Measurements on the  $\Sigma$  Bend of Ar-HCl" Kerry L. Busarow, Geoffrey A. Blake, Kenneth B. Laughlin, Ronald C. Cohen, Yuan T. Lee, & Richard J. Saykally 1988, *J. Chem. Phys.* **89**, 1268.

- [32] "Tunable Far-IR Laser Spectroscopy of Hydrogen Bonds: The  $K_a = 0(u) \rightarrow 1(g)$  Tunneling-Rotation Spectrum of the HCl Dimer" Geoffrey A. Blake, Kerry L. Busarow, Ronald C. Cohen, K.B. Laughlin, Yuan T. Lee, & Richard J. Saykally 1988, *J. Chem. Phys.* **89**, 6577.
- [33] "Tunable Far-IR Laser Spectroscopy of van der Waals Bonds: Vibration-Rotation-Tunneling Spectra of Ar-H<sub>2</sub>O" Ronald C. Cohen, K.L. Busarow, K.B. Laughlin, Geoffrey A. Blake, M.L. Havenith, Y.T. Lee, & Richard J. Saykally 1988, *J. Chem. Phys.* **89**, 4494.
- [34] "Experimental Determination of Dipole Moments for Molecular Ions: Improved Measurements for ArH<sup>+</sup>" Kenneth B. Laughlin, Geoffrey A. Blake, Ronald C. Cohen, & Richard J. Saykally 1989, *J. Chem. Phys.* **90**, 1358.
- [35] "Measurement of the Perpendicular Rotation-Tunneling Spectrum of the Water Dimer by Tunable Far-Infrared Laser Spectroscopy in a Planar Supersonic Jet" Kerry L. Busarow, Ronald C. Cohen, Geoffrey A. Blake, Kenneth B. Laughlin, Yuan T. Lee, & Richard J. Saykally 1989, *J. Chem. Phys.* **90**, 3937.
- [36] "The Abundances of Atomic Carbon and Carbon Monoxide Compared with Visual Extinction in the Ophiuchus Molecular Cloud Complex" Margaret A. Frerking, Jocelyn Keene, Geoffrey A. Blake, & Thomas G. Phillips 1989, *Ap. J.* **344**, 311.
- [37] "Microwave Direct Absorption Spectroscopy of Weakly Bound Clusters in a Planar Supersonic Jet: Spectra of Ar-HCN and (HCN)<sub>2</sub> from 17.4 - 76.7 GHz" Roger E. Bumgarner & Geoffrey A. Blake 1989, *Chem. Phys. Lett.* **161**, 308.
- [38] "Direct Measurement of the HCl Dimer Tunneling Rates and Cl Isotope Dependence by Far-Infrared Laser Sideband Spectroscopy of Supersonic Jets" Geoffrey A. Blake & Roger E. Bumgarner 1989, *J. Chem. Phys.* **91**, 7300.
- [39] "Tunable Far Infrared Laser Spectroscopy of Deuterated Isotopomers of Ar-H<sub>2</sub>O" Sakae Suzuki, Roger E. Bumgarner, Paul A. Stockman, Peter G. Green, & Geoffrey A. Blake 1991, *J. Chem. Phys.* **94**, 824.
- [40] "Microwave and Tunable Far-IR Laser Spectroscopy of H<sub>2</sub>O-CO: Investigation of the Water Tunneling Potential" Roger E. Bumgarner, Sakae Suzuki, Paul A. Stockman, Peter G. Green, & Geoffrey A. Blake 1991, *Chem. Phys. Lett.* **176**, 123.
- [41] "The Berkeley Tunable Far Infrared Laser Spectrometers" Geoffrey A. Blake, Kenneth B. Laughlin, Ronald C. Cohen, Kerry L. Busarow, Duo H. Gwo, Charles A. Schmuttenmaer, David W. Steyert, & Richard J. Saykally 1991, *Rev. Sci. Instr.* **62**, 1701.
- [42] "Molecular Line Survey of Sgr B2(M) from 330 to 355 GHz and Comparison with Sgr B2(N)" Edward C. Sutton, Paul A. Jaminet, Willaim C. Danchi, & Geoffrey A. Blake 1991, *Ap. J. Suppl.* **77**, 255.
- [43] "IRAS 16293-2422: A Very Young Binary System?" Lee G. Mundy, H. Alwyn Wootten, Bruce A. Wilking, Geoffrey A. Blake, & Anneila I. Sargent 1992, *Ap. J.* **385**, 306.
- [44] "Microwave and Tunable Far-Infrared Laser Spectroscopy of the Ammonia-Water Dimer" Paul A. Stockman, Roger E. Bumgarner, Sakae Suzuki, & Geoffrey A. Blake 1992, *J. Chem. Phys.* **96**, 2496.
- [45] "Chemistry in Circumstellar Disks: CS Toward HL Tauri" Geoffrey A. Blake, Ewine F. van Dishoeck, & Anneila I. Sargent 1992, *Ap. J. (Letters)* **391**, L99.
- [46] "Laser Induced Isotopic Selectivity in the Resonance Ionization of Os" Rainer K. Wunderlich, Ian D. Hutcheon, Gerald J. Wasserburg, & Geoffrey A. Blake 1992, *Int. J. Mass Spec. Ion Proc.* **115**, 123.

- [47] “Ground-Based Searches for Interstellar  $\text{H}_2\text{D}^+$ ” Ewine F. van Dishoeck, Thomas G. Phillips, Jocelyn B. Keene, & Geoffrey A. Blake 1992, *Astr. Ap.* **261**, L13.
- [48] “Benzene Forms Hydrogen Bonds with Water” Sakae Suzuki, Peter G. Green, Siddarth Dasgupta, William A. Goddard, & Geoffrey A. Blake 1992, *Science* **257**, 942.
- [49] “Multidimensional Hydrogen Tunneling Dynamics in the Ground Vibrational State of the Ammonia Dimer” Jennifer G. Loeser, Charles A. Schmuttenmaer, Ronald C. Cohen, Matthew J. Elrod, Richard J. Saykally, Roger E. Bumgarner, & Geoffrey A. Blake 1992, *J. Chem. Phys.* **97**, 4727.
- [50] “The Structure and Chemistry of Orion-S” Joseph P. McMullin, Lee G. Mundy, & Geoffrey A. Blake 1993, *Ap. J.* **405**, 599.
- [51] “Improved Ground State Rotational Constants for the Argon-Hydrogen Fluoride Dimer” Paul A. Stockman & Geoffrey A. Blake 1993, *J. Chem. Phys.* **98**, 4307.
- [52] “Hydrogen Bonding in the Benzene-Ammonia Dimer” Dave Rodham, Sakae Suzuki, Richard Suenram, Francis J. Lovas, Siddarth Dasgupta, William A. Goddard III, & Geoffrey A. Blake 1993, *Nature* **362**, 735.
- [53] “Laser Induced Isotopic Effects in Ti Resonance Ionization” Rainer K. Wunderlich, Ian D. Hutcheon, Gerald J. Wasserburg, & Geoffrey A. Blake 1993, *Anal. Chem.* **65**, 1411.
- [54] “HF-Cl<sub>2</sub>: Bending Dynamics of an Antihydrogen-Bonded van Der Waals Dimer” Paul A. Stockman, Peter G. Green, & Geoffrey A. Blake 1993, *Chem. Phys. Lett.* **212**, 298.
- [55] “The Circumstellar Environment of the Pre-FU Orionis Outburst Candidate V1331 Cygni” Stuart McMudroch, Anneila I. Sargent, & Geoffrey A. Blake 1993, *A.J.* **106**, 2477.
- [56] “Millimeter and Centimeter Observations of Young Stellar Objects in the Serpens Molecular Core” Joseph P. McMullin, Lee G. Mundy, Bruce A. Wilking, Terence Hezel, & Geoffrey A. Blake 1994, *Ap. J.* **424**, 222.
- [57] “Evidence for HCO<sup>+</sup> Infall Toward T Tauri?” Huib Jan van Langevelde, Ewine F. van Dishoeck, & Geoffrey A. Blake 1994, *Ap. J. (Letters)* **425**, L45.
- [58] “Molecular Abundances and Low Mass Star Formation I. Si- and S-Bearing Species Towards IRAS 16293-2422” Geoffrey A. Blake, Ewine F. van Dishoeck, David Jansen, Todd D. Groesbeck, & Lee G. Mundy 1994, *Ap. J.* **428**, 680.
- [59] “The Spatial Distribution of Excited H<sub>2</sub> in T Tau: A Molecular Outflow in a Young Binary System” Huib Jan van Langevelde, Ewine F. van Dishoeck, Paul P. van der Verff, & Geoffrey A. Blake 1994, *Astr. Ap.* **287**, L25.
- [60] “The Molecular Line Emission Spectrum of IRC+10216 Between 330 and 358 GHz” Todd D. Groesbeck, Thomas G. Phillips, & Geoffrey A. Blake 1994, *Ap. J. Suppl.* **94**, 147.
- [61] “Pseudorotation in the D<sub>2</sub>O Trimer” Sakae Suzuki & Geoffrey A. Blake 1994, *Chem. Phys. Lett.*, **229**, 499.
- [62] “The Circumstellar Environment of IRAS 05338-0624” Joseph P. McMullin, Lee G. Mundy, & Geoffrey A. Blake 1994, *Ap. J.* **437**, 305.
- [63] “A Molecular Line Study of the Young Stellar Object NGC 1333 IRAS 4” Geoffrey A. Blake, Todd Groesbeck, Lee G. Mundy, Ewine F. van Dishoeck, & Goeran Sandell 1995, *Ap. J.* **441**, 689.
- [64] “HCl Absorption Toward Sagittarius B2” J. Zmuidzinas, Geoffrey A. Blake, John Carlstrom, Jocelyn Keene, & David Miller 1995, *Ap. J. (Letters)* **447**, L125.



- [65] “The FU Orionis Binary System RNO 1B/1C” Stuart McMuldroy, Geoffrey A. Blake, & Anneila I. Sargent 1995, *A.J.* **110**, 354.
- [66] “Molecular Abundances and Low Mass Star Formation II. Organic and Deuterated Species Towards *IRAS* 16293-2422”, Ewine F. van Dishoeck, Geoffrey A. Blake, David Jansen, & Todd D. Groesbeck 1995, *Ap. J.* **447**, 760.
- [67] “G2 Theory Calculations on the Proton Affinities of  $[H_4SiO_4]$ ,  $[H_4AlO_4]^-$  and  $[H_5AlO_4]$ ” James D. Kubicki, Sabine E. Apitz, & Geoffrey A. Blake 1995, *Physics and Chemistry of Minerals* **22**, 481.
- [68] “Ab Initio Calculations on Aluminosilicate  $Q^3$  Species: Implications for Atomic Structures of Mineral Surfaces and the Dissolution Mechanisms of Feldspars” James D. Kubicki, Geoffrey A. Blake, & Sabine E. Apitz 1996, *American Mineralogist* **81**, 789.
- [69] “A  $\lambda=1.3$  mm Aperture Synthesis Molecular Line Survey of Orion KL” Geoffrey A. Blake, Lee G. Mundy, John E. Carlstrom, Steve Padin, Steve L. Scott, Nicholas Z. Scoville, & David P. Woody 1996, *Ap.J.(Letters)* **472**, L49.
- [70] “Molecular Orbital Models of Aqueous Aluminum-Acetate Complexes” James D. Kubicki, Geoffrey A. Blake, & Sabine E. Apitz 1996, *Geochim. Cosmochim. Acta* **60**, 4897.
- [71] “ZEKE-PFI Spectroscopy of 1:1 Complexes of Sodium with Water and Ammonia” David Rodham & Geoffrey A. Blake 1997, *Chem. Phys. Lett.* **264**, 522.
- [72] “Molecular Orbital Calculations for Modeling Acetate-Aluminosilicate Adsorption and Dissolution Reactions” James D. Kubicki, Geoffrey A. Blake, & Sabine E. Apitz 1997, *Geochim. Cosmochim. Acta* **61**, 1031.
- [73] “A 325 to 360 GHz Emission Line Survey of the Orion KL Region” Peter Schilke, Todd Groesbeck, Geoffrey A. Blake, & Thomas G. Phillips 1997, *Ap. J. Suppl.* **108**, 301.
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**INVITED REVIEWS AND CONFERENCE PROCEEDINGS**  
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## BOOKS EDITED

- [1] "Astrochemistry throughout the Universe: Recent Successes and Current Challenges" 2006 (IAU Symp. #231), D.C. Lis, G.A. Blake & E. Herbst, Eds. (Dordrecht: Kluwer), 524 pp.

## TEACHING EXPERIENCE

**Ch 1b. General Chemistry.** Lectures and recitations dealing with the principles of chemistry. First term: electronic structure of atoms, periodic properties, ionic substances, covalent bonding, Lewis representations of molecules and ions, shapes of molecules, Lewis acids and bases, Bronsted acids and bases, hybridization and resonance, bonding in solids (Ch 1a, Lewis). Second term: chemical equilibria, oxidation and reduction, thermodynamics (Ch 1b, Blake), kinetics, introduction to organic chemistry and the chemistry of life (Ch 1b, Reisman, Dougherty). Graded pass/fail.

**Ch 21b. The Physical Description of Chemical Systems.** Quantum mechanics (Ch21a, M. Okumura); atomic and molecular spectroscopy (Ch21b, G. Blake); thermodynamics, statistical mechanics, and chemical kinetics (Ch21c, T. Miller).

**Ge 104/5. Geochemistry.** An introduction to geochemical principles and techniques, with an emphasis on the composition of global reservoirs and the mechanisms and time scales for coupling between them. Origin of the elements and their classification; origin of the terrestrial planets. Partitioning of major and trace elements in the Earth; geochemical cycles. Isotope geochemistry of stable and radiogenic nuclides; geothermometry, and geochronology. Geochemical modeling of environmental pollution. Course content now folded into Ge 101 (Ge 104 has become the introductory graduate course in Geobiology).

**Ch 126 (formerly 130). Molecular Spectra and Molecular Structure.** Quantum mechanical foundations of the spectroscopy of molecules. Topics include quantum theory of angular momentum, rovibrational Hamiltonian for polyatomic molecules, molecular symmetry and permutation-inversion groups, electronic spectroscopy, interaction of radiation and matter, multi-dimensional/nonlinear spectroscopy.

**Ch/Ge 128. Cosmochemistry.** The chemistry of the interstellar medium, of protostellar nebulae, and of primitive solar system objects with a view towards establishing the relationship of chemical evolution of atoms in the interstellar radiation field to complex molecules and aggregates in the early solar system. Emphasis is placed on identifying the physical conditions in various objects, time scales for physical and chemical change, chemical processes leading to change, observational constraints, and various models which attempt to describe the chemical state and history of cosmological objects in general and the early solar system in particular.

**Ay/Ge 132. Atomic and Molecular Processes in Astronomy and Planetary Science.** Fundamental aspects of atomic and molecular spectra that enable one to infer physical conditions in astronomical, planetary, and terrestrial environments. Topics include the structure and spectra of atoms, molecules, and solids; transition probabilities; photoionization/recombination; collisional processes; gas-phase reactions; and isotopic fractionation. Each topic will be illustrated with applications in astronomy and planetary science, ranging from the early universe to dense interstellar clouds and the solar system.

**Ay/Ge 133. The Formation and Evolution of Planetary Systems.** Review of current theoretical ideas and observations pertaining to the formation and evolution of planetary systems. Topics to be covered include low mass star formation, the protoplanetary disk, accretion and condensation in the solar nebula, the formation of gas giants, meteorites, the outer solar system, giant impacts, extrasolar planetary systems.

These courses are aimed primarily at the advanced undergraduate and/or first year graduate level. Ch/Ge 128, Ay/Ge 132+133, and Ge 104/105 are “new” courses, in that they were not taught before my arrival. Student feedback has consistently been quite positive, and web sites are available for all currently taught courses (see <http://www.gps.caltech.edu/~gab/classes.html>). I firmly believe that as a faculty member it is important to be involved with educational opportunities at all levels in the Institute and the local community, and as such devote a that fraction of my time to teaching consistent with leading a world class research effort. For example, I have regularly participated in a variety of Division field courses, both to learn about the geological sciences and to interact with students in a unique setting. I have also lived on campus as a Resident Faculty member of Avery House for the first two years of its existence, and have recently completed a five year term as the Master of Student Houses (MOSH) at Caltech. For four+ years I served as the Faculty Chair of the Caltech MURF Advisory Committee and the Caltech Undergraduate Admissions Committee. In addition, I have attended Frosh Camp on many occasions, have participated as a science professional in the Project CAPSI/SEED programs for the past decade, served on the Caltech Y board, and have volunteered with several local K-12 campuses that principally serve economically disadvantaged populations in the great Los Angeles area.