Hans A. Bechtel

Lawrence Berkeley National Laboratory • 1 Cyclotron Road MS 6-2100 • Berkeley, CA 94720
Phone: 510-486-7519 • Email: HABechtel@lbl.gov

EDUCATION

Ph.D., Physical Chemistry, Stanford University (2004)

B.S. *summa cum laude,* Chemistry and Computer Science / Mathematics, Furman University (1999)

PROFESSIONAL EXPERIENCE

2007 – present *Senior Scientific Engineering Associate* Lawrence Berkeley National Laboratory
Improving capabilities at the Advanced Light Source (ALS) infrared beamlines while providing user support for cutting edge infrared science.

2004 – 2007 *Postdoctoral Fellow* Massachusetts Institute of Technology
Developed experimental techniques to reveal isomerization dynamics in small polyatomic molecules of combustion and astronomical interest. (Advisor: Robert W. Field)

2000 – 2004 *Graduate Research Assistant* Stanford University
Investigated photochemical processes and fundamental gas phase reaction dynamics relevant to atmospheric processes. Demonstrated bond and mode selectivity in a polyatomic chemical reaction. (Advisor: Richard N. Zare)

1999 – 2000 *Graduate Research Assistant* Stanford University
Observed first antibunching signatures of single CdSe/ZnS nanoparticles with confocal scanning microscopy. (Advisor: W. E. Moerner)

1999 – 2003 *Advanced Teaching Assistant* Stanford University
Organized teaching assistants, held review sessions, met individually with students, and wrote exam questions.

1997 – 1999 *Undergraduate Research Assistant* Furman University
Developed a new technique to mass-select and matrix-isolate radical cations for electron spin resonance (ESR) spectroscopy. (Advisor: Lon B. Knight, Jr.)

AWARDS AND HONORS

- Annual Reviews Prize in Physical Chemistry, Stanford University (2004)
- G.J. Lieberman Fellow in the Natural and Physical Sciences, Stanford University (2002–2003)
- National Science Foundation Graduate Research Fellowship (1999–2002)
- Stanford Graduate Fellowship (1999–2002)
- Paul J. Flory Award, Stanford University (1999)
- President's Award, Furman University (1999)
- Barry M. Goldwater Scholarship in Mathematics, Science, and Engineering (1998)
- Phi Beta Kappa, Furman University (1998)
- Omicron Delta Kappa Leadership Honor Society, Furman University (1998)
- Rhodes Scholar Finalist (1998)
- Reid Memorial Award for Leadership, Scholarship, and Character, Furman University (1998)
- Herman W. Lay Presidential Scholarship, Furman University (1995-1999)

AFFILIATIONS

- Sigma Xi
- Optical Society of America
- American Chemical Society
- Amateur Radio, Extra Class License, *AC4AX*

PUBLICATIONS

(26) "Stretch-bend combination polyads in the $\tilde{A}^1A_u$ state of acetylene, C_2H_2." A. H. Steeves, H. A. Bechtel, A. J. Merer, N. Yamakita, S. Tsuchiya, and R. W. Field, *J. Mol. Spectrosc*. **256,** 256–278 (2009).

(25) "Direct observation of the symmetric stretching modes of $\tilde{A}^1A_u$ acetylene by pulsed supersonic jet laser induced fluorescence." A. H. Steeves, A. J. Merer, H. A. Bechtel, A. R. Beck, and R. W. Field, *Mol Phys*. **106,** 1867–1877 (2008).

(24) "Darling-Dennison resonance and Coriolis coupling in the bending overtone of the $\tilde{A}^1A_u$ state of acetylene, C_2H_2." A. J. Merer, N. Yamakita, S. Tsuchiya, A. H. Steeves, H. A. Bechtel, and R. W. Field, *J. Chem. Phys.* **129,** 054304 (2008).

(23) "Evolution of chemical bonding during HCN↔HNC isomerization as revealed through nuclear quadrupole hyperfine structure." H. A. Bechtel, A. H. Steeves, B. M. Wong, and R. W. Field, *Angew. Chem. Int. Ed.* **47**, 2969-2972 (2008).

(22) "Beam action spectroscopy via inelastic scattering." Bobby H. Layne, Liam M. Duffy, Hans A. Bechtel, Adam H. Steeves, and Robert W. Field. *J. Phys. Chem. A*, **111**, 7398-7403 (2007).

(21) "Observation of the $\tilde{A}\,^1A''$ state of isocyanogen." Bryan W. Lynch, Hans A. Bechtel, Adam H. Steeves, John J. Curley, and Robert W. Field, *J. Chem. Phys.* **126**, 244307/1-4 (2007).

(20) "Laboratory measurements of the hyperfine structure of $H^{14}N^{12}C$ and $D^{14}N^{12}C$." Hans A. Bechtel, Adam H. Steeves, and Robert W. Field, *Astrophys. J.* **649**, L53-L56 (2006).

(19) "H + CD_4 abstraction reaction dynamics: product energy partitioning." Wenfang Hu, György Lendvay, Diego Troya, George C. Schatz, Jon P. Camden,Hans A. Bechtel, Davida J. A. Brown, Marion R. Martin, and Richard N. Zare, *J. Phys. Chem. A*, **110***,* 3017-3027 (2006).

(18) "H + CD_4 abstraction reaction dynamics: excitation function and angular distributions." Jon P. Camden, Wenfang Hu, Hans A. Bechtel, Davida J. Ankeny Brown, Marion R. Martin, Richard N. Zare, György Lendvay, Diego Troya, and George C Schatz, *J. Phys. Chem. A* **110,** 677-686 (2006).

(17) "Comparing Reactions of H and Cl with C-H stretch-excited CHD_3." Jon P. Camden, Hans A. Bechtel, Davida J. Ankeny Brown, and Richard N. Zare, *J. Chem. Phys.* **124**, 034311 (2006).

(16) "Millimeter-wave detected, millimeter-wave optical polarization spectroscopy (mmOPS)."Adam H. Steeves, Hans A. Bechtel, Stephen L. Coy, Robert W. Field, *J. Chem. Phys.* **123**, 141102 (2005).

(15) "Effects of C-H stretch excitation on the H + CH_4 reaction." Jon P. Camden, Hans A. Bechtel, Davida J. Ankeny Brown, and Richard N. Zare, *J. Chem. Phys.* **123**, 134301 (2005).

(14) "A reinterpretation of the mechanism of the simplest reaction at an sp^3-hybridized carbon atom: H + CD_4 →CD_3 + HD." Jon P. Camden, Hans A. Bechtel, Davida J. Ankeny Brown, Marion R. Martin, Richard N. Zare,Wenfang Hu, György Lendvay, Diego Troya, and George C. Schatz, *J. Am. Chem. Soc.* **127**, 11898-11899 (2005).

(13) "Correlated energy disposal and scattering dynamics of the Cl + $CD_4(v_3=2)$ reaction." Hans A. Bechtel, Zee Hwan Kim, Jon P. Camden, and Richard N. Zare, *Mol. Phys.* **103**, 1837-1846 (2005).

(12) “Effects of bending excitation on the reaction of chlorine atoms with methane.” Hans A. Bechtel, Jon P. Camden, Davida J. A. Brown, Marion R. Martin, Richard N. Zare, and Konstantin Vodopyanov, *Angew. Chem. Int. Ed.* **44**, 2382-2385 (2005).

(11) “Effect of bending and torsional mode excitation on the reaction $Cl+CH_4 \rightarrow HCl+CH_3$.” Zee Hwan Kim, Hans A. Bechtel, Jon P. Camden, and Richard N. Zare, *J. Chem. Phys*. **122**, 084303 (2005).

(10) “Probing excited electronic states using vibrationally mediated photolysis: application to hydrogen iodide.” Jon P. Camden, Hans A. Bechtel, Davida J. Ankeny Brown, Andrew E. Pomerantz, Richard N. Zare, and Robert J. Le Roy, *J. Phys. Chem. A.* **108**, 7806-7813 (2004).

(9) “Design and characterization of a late-mixing pulsed nozzle.” Jon P. Camden, Hans A. Bechtel, Richard N. Zare, *Rev. Sci. Instrum*. **75**, 556-558 (2004).

(8) “Comparing the dynamical effects of symmetric and antisymmetric excitation of methane on the Cl + CH_4 reaction.” Hans A. Bechtel, Jon P. Camden, Davida J. Ankeny Brown, Richard N. Zare, *J. Chem. Phys*. **120**, 5096-5103 (2004).

(7) “State-to-state dynamics of the $Cl + CH_3OH \rightarrow HCl + CH_2OH$ Reaction.” Hans A. Bechtel, Jon P. Camden, and Richard N. Zare, *J. Chem. Phys*. **120**, 4231-4239 (2004).

(6) “Bond and mode selectivity in the reaction of atomic chlorine with vibrationally excited CH_2D_2.” Hans A. Bechtel, Zee Hwan Kim, Jon P. Camden, and Richard N. Zare, *J. Chem. Phys.* **120**, 791-799 (2004).

(5) “Dynamics of the simplest reaction of a carbon atom in a tetrahedral environment.” Jon P. Camden, Hans A. Bechtel, Richard N. Zare, *Angew. Chem. Int. Ed.* **42**, 5227-5230 (2003).

(4) “Channel-specific angular distributions of HCl and CH_3 products from the reaction of atomic chlorine with stretch-excited methane.” Zee Hwan Kim, Hans A. Bechtel, and Richard N. Zare, *J. Chem. Phys*. **117**, 3232-3242 (2002).

(3) “Vibrational control in the reaction of methane with atomic chlorine.” Zee Hwan Kim, Hans A. Bechtel, and Richard N. Zare, *J. Am. Chem. Soc.* **123**, 12714-12715 (2001).

(2) “Comparison of near-threshold reactivity of ground-state and spin-orbit excited chlorine atoms with methane.” Zee Hwan Kim, Andrew J. Alexander, Hans A. Bechtel, and Richard N. Zare, *J. Chem. Phys.* **115**, 179-183 (2001).

(1) “Photon antibunching in single CdSe/ZnS quantum dot fluorescence.” Brahim Lounis, Hans A. Bechtel, Daniel Gerion, Paul Alivisatos, and W.E. Moerner, *Chem. Phys. Lett*. **329**, 399-404 (2000).