Literaturverzeichnis

[1] U. Marvet and M. Dantus. Femtosecond photoassociation spectroscopy: Coherent bond formation. *Chem. Phys. Lett.*, 245:393–399, 1995.

[2] A. H. Zewail, editor. *Femtochemistry – Ultrafast Dynamics of the Chemical Bond*, Singapore, 1994. World Scientific.

[3] J. Manz and L. Wöste, editors. *Femtosecond Chemistry*, Weinheim, 1995. Verlag Chemie.

[4] M. Chergui, editor. *Ultrafast Chemical and Physical Processes in Molecular Systems*, Singapore, 1996. World Scientific.

[5] A. H. Zewail. Femtochemistry: Recent progress in studies of dynamics and control of reactions and their transition state. *J. Phys. Chem.*, 100:12701–12724, 1996.

[6] K. C. Kulander, editor. *Special Issue on Time-Dependent Methods For Quantum Dynamics*, volume 63 of *Comp. Phys. Commun.*, 1991.

[7] J. Manz and A. W. Castleman, Jr, editors. *Special Issue on Femtosecond Chemistry*, volume 97 of *J. Phys. Chem.*, 1993.

[8] R. E. Wyatt and J. Z. H. Zhang, editors. *Dynamics of Molecules and Chemical Reactions*, New York, 1996. Dekker.

[9] W. Domcke, P. Hänggi, and D. Tannor, editors. *Special Issue on Dynamics of Driven Quantum Systems*, volume 217 of *Chem. Phys.*, 1997.

[10] J. Manz. Molecular wavepacket dynamics: Theory for experiments 1926-1996. In V. Sundström, editor, *Femtochemistry and Femtobiology:Ultrafast Reaction Dynamics at Atomic-Scale Resolution*, pages 80–318. Imperial College Press, London, 1997.

[11] R. Schinke. *Photodissociation Dynamics*. Cambridge University Press, Cambridge, 1993.

[12] K. Finger, C. Daniel, P. Saalfrank, and B. Schmidt. Non–adiabatic effects in the photodissociation and electronic spectroscopy of $HMn(CO)_3$(dab): Quantum wave packet dynamics based on ab-initio potentials. *J. Phys. Chem.*, 100:3368–3376, 1996.

[13] M. Kaluža, J. T. Muckerman, P. Gross, and H. Rabitz. Optimally controlled five–laser infrared multiphoton dissociation of HF. *J. Chem. Phys.*, 100:4211–4228, 1994.

[14] M. Kaluža and J. T. Muckerman. Bond selective infrared multiphoton excitation and dissociation of linear monodeuterated acetylene. *J. Chem. Phys.*, 105:535–550, 1996.

[15] M. V. Korolkov, G. K. Paramonov, and B. Schmidt. State–selective control for vibrational excitation and dissociation of diatomic molecules with shaped ultrashort laser pulses. *J. Chem. Phys.*, 105:1862–1879, 1996.

[16] J. E. Combariza, B. Just, J. Manz, and G. K. Paramonov. Isomerizations controlled by ultrashort infrared laser pulses: Model simulations for the inversion of ligands (H) in the double–well potential of an organometallic compound, $[(C_5H_5)(CO)_2FePH_2]$. *J. Phys. Chem.*, 95:10351–10359, 1991.

[17] J. Manz, G. K. Paramonov, M. Polasek, and C. Schütte. Overtone state–selective isomerizations by a series of picosecond infrared laser pulses: Model simulations for $Be_2H_3D^-(C_{2v} \rightarrow C_{3v})$. *Israel J. Chem.*, 34:115–125, 1994.

[18] M. Dohle, J. Manz, and G. K. Paramonov. A pump & dump & probe strategy for the spectroscopy of the transition state during a laser–controlled isomerization: Model simulation for the cope–rearrangement of 1–methyl–5–ethyl–2,6–dicyano semibullvalene. *Ber. Bunsenges.*, 99:478–484, 1995.

[19] M. Dohle, J. Manz, G. K. Paramonov, and H. Quast. Design of substituted semibullvalenes suitable for control of the cope rearrangement by two ps IR laser pulses. *Chem. Phys.*, 197:91–97, 1995.

[20] C. Wittig, S. Sharpe, and R. A. Beaudet. Photoinitiated reactions in weakly bonded clusters. *Acc. Chem. Res.*, 21:341–347, 1988.

[21] N.F. Scherer, L.R. Khundkar, R.B. Bernstein, and A.H. Zewail. Real-time picosecond clocking of the collision complex in a bimolecular reaction: The birth of OH from H + CO_2. *J. Chem. Phys*, 87:1451, 1987.

[22] S.I. Ionov, G.A. Brucker, C. Jaques, L. Valachovic, and C. Wittig. Subpicosecond resolution studies of the H + CO_2 $\rightarrow$ CO + OH reaction photoinitiated in CO_2–HI complexes. *J. Chem. Phys.*, 99:6553, 1993.

[23] M. Takayanagi and I. Hanazaki. Photochemical processes in weakly bound binary complexes. *Chem. Rev.*, 91, 1991.

[24] H.-J. Foth, H.R. Mayne, R.A. Poirier, J.C. Polanyi, and H.H. Telle. The spectroscopy of transition states in H + H_2 reaction, and NaI photodissociation. *Laser Chemistry*, 2:229–241, 1989.

[25] D. Gerlich and G. Kaefer. Ion trap studies of association processes in collisions of CH_3^+ and CD_3^+ with n-H_2, p-H_2, and He at 80 K. *Astrophys. J.*, 347:849–854, 1989.

[26] D. Gerlich and S. Horning. Experimental investigation of radiative association processes as related to interstellar chemistry. *Chem. Rev.*, 92:1509–1539, 1992.

[27] M. M. Graff, J. T. Moseley, and E. Roueff. Resonant and non–resonant processes in the formation of by radiative association. *Astrophys. J.*, 269:796–802, 1983.

[28] M. V. Korolkov, Y. A. Logvin, and G. K. Paramonov. Laser control of ultrafast state–selective preparation of OH at high vibrational levels. *J. Phys. Chem.*, 100:8070–8078, 1996.

[29] J. H. Schloss, R. B. Jones, and J. G. Eden. Photoassociation of Kr–F collision pairs in the ultraviolett. *J. Chem. Phys.*, 99:6483, 1993.

[30] A. W. McCown and J. G. Eden. Ultraviolet photoassociative production of XeCl(B,C) molecules in Xe/Cl_2 gas mixtures: Radiative lifetime of $Xe_2Cl(4^2\Gamma)$. *J. Chem. Phys.*, 81:2933–2938, 1984.

[31] E. B. Gordon, V. G. Egorov, S. E. Nalivaiko, V. S. Pavlenko, and O. S. Rzhevsky. The theoretical and experiment distinguishing of photoassociation into the XeCl(B) state. *Chem. Phys. Lett.*, 242:75–82, 1995.

[32] G. Rodriguez and J. G. Eden. Bound $\rightarrow$ free emission spectra and photoassociation of $^{114}Cd_2$ and $^{64}Zn_2$. *J. Chem. Phys.*, 95:5539, 1991.

[33] H. R. Thorsheim, J. Weiner, and P. S. Julienne. Laser–induced photoassociation of ultracold sodium atoms. *Phys. Rev. Lett.*, 58:2420–2423, 1987.

[34] P. D. Lett, K. Helmerson, W. D. Phillips, L. P. Ratliff, S. L. Rolston, and M. E. Wagshul. Spectroscopy of Na_2 by photoassociation of laser–cooled Na. *Phys. Rev. Lett.*, 71:2200–2203, 1993.

[35] V. Bagnato, L. Marcassa, C. Tsao, Y. Wang, and J. Weiner. Two–color spectroscopy of colliding ultracold atoms. *Phys. Rev. Lett.*, 70:3225–3228, 1993.

[36] R. Napolitano, J. Weiner, C. J. Williams, and P. S. Julienne. Line shapes of high resolution photoassociation spectra of optically cooled atoms. *Phys. Rev. Lett.*, 73:1352–1355, 1994.

[37] C. J. Williams and P. S. Julienne. Molecular hyperfine structure in the photoassociation spectroscopy of laser–cooled atoms. *J. Chem. Phys.*, 101:2634–2637, 1994.

[38] L. P. Ratliff, M. E. Wagshul, P. D. Lett, S. L. Rolston, and W. D. Phillips. Photoassociative spectroscopy of 1_g, O_u^+, and O_g^- states of Na_2. *J. Chem. Phys.*, 101:2638–2641, 1994.

[39] D. Leonhardt and J. Weiner. Direct two–color photoassociative ionization in a rubidium magneto–optic trap. *Phys. Rev. A*, 52:4332–4335, 1995.

[40] Y. B. Band and P. S. Julienne. Ultracold–molecule production by laser–cooled atom photoassociation. *Phys. Rev. A*, 51:4317–4320, 1995.

[41] Y. B. Band and I. Tuvi. Reduced optical shielding for laser–cooled atoms. *Phys. Rev. A*, 51:4329–4332, 1995.

[42] C.-C. Tsao, R. Napolitano, Y. Wang, and J. Weiner. Ultracold photoassociative inoization collisions in an atomic beam: Optical field intensity and polarization dependence of the rate constant. *Phys. Rev. A*, 51:18–21, 1995.

[43] P. D. Lett, P. S. Julienne, and W. D. Phillips. Photoassociative spectroscopy of laser–cooled atoms. *Annu. Rev. Phys. Chem.*, 46:423–452, 1995.

[44] M. Machholm, A. Giusti-Suzor, and F. H. Mies. Photoassociation of atoms in ultracold collisions probed by wave–packet dynamics. *Phys. Rev. A*, 50:5025–5036, 1994.

[45] U. Marvet and M. Dantus. Femtosecond photoassociation spectroscopy: Coherent bond formation. In M. Chergui, editor, *Ultrafast Chemical and Physical Processes in Molecular Systems*, pages 138–142. World Scientific, Singapore, 1996.

[46] U. Marvet Q. Zhang and M. Dantus. Femtosecond dynamics of unimolecular and unrestrictred bimolecular reactions. *J. Phys. Chem., submitted*, 1998.

[47] P. Backhaus, J. Manz, and B. Schmidt. Comment on femtochemistry of bimolecular reactions from van der Waals precursors versus collision pairs. *Adv. Chem. Phys.*, 101:86–87, 1996.

[48] P. Backhaus and B. Schmidt. Femtosecond quantum dynamics of photoassociation reactions: The exciplex formation of mercury. *Chem. Phys.*, 217:131–143, 1997.

[49] P. Gross and M. Dantus. Femtosecond photoassociation: Coherence and implications for control in bimolecular reactions. *J. Chem. Phys*, 106:8013–8021, 1997.

[50] N. Došlić and S.D. Bosanac. Harmonic oscillator with the radiation reaction interaction. *Phys. Rev. A*, 51:3485–3494, 1995.

[51] M. Berblinger and Ch. Schlier. Classical radiation spectra of long–lived H_3^+ complexes. *Mol. Phys.*, 63:779–790, 1988.

[52] G. G. Hammes. *Principles of Chemical Kinetics*. Academic, New York, 1978.

[53] J. Troe. Elementary reactions in compressed gases and liquids: From collisional energy transfer to diffusion control. *J. Phys. Chem.*, 90:357–365, 1986.

[54] H. M. J. M. Boesten, C. C. Tsai, B. J. Verhaar, and D. J. Heinzen. Observation of a shape resonance in cold–atom scattering by pulsed photoassociation. *Phys. Rev. Lett.*, 77:5194–5197, 1996.

[55] C. Cohen-Tannoudji, B. Liu, and F. Laloe. *Quantum Mechanics*. Wiley, New York, 1977.

[56] H. Friedrich. *Theoretische Atomphysik*. Springer, Berlin, 1990.

[57] W. Nolting. *Quantenmechanik*. Zimmermann-Neufang, Ulmen, 1993.

[58] C. C. Marston and G. G. Balint-Kurti. The Fourier grid Hamiltonian method for bound state eigenvalues and eigenfunctions. *J. Chem. Phys.*, 91:3571–3576, 1989.

[59] G. Arfken. *Mathematical Methods for Physicists*. Academic, Boston, 1985.

[60] R. Loudon. *The Quantum Theory of Light*. Clarendon, Oxford, 1973.

[61] G. K. Paramonov and V. A. Savva. Resonance effects in molecule vibrational excitation by picosecond laser pulses. *Phys. Lett. A*, 97:340–342, 1983.

[62] H. Hönl and F. London. Über die Intensitäten der Bandenlinien. *Zeitschrift für Physik*, 33:803–809, 1925.

[63] M. D. Feit, J. A. Fleck, Jr, and A. Steiger. Solution of the Schrödinger equation by a spectral method. *J. Comput. Phys.*, 47:412, 1982.

[64] C. Leforestier, R. H. Bisseling, C. Cerjan, M. D. Feit, R. Friesner, A. Guldberg, A. Hammerich, G. Jolicard, W. Karrlein, H.-D. Meyer, N. Lipkin, O. Roncero, and R. Kosloff. A comparison of different propagation schemes for the time dependent Schrödinger equation. *J. Comp. Phys.*, 94:59, 1991.

[65] R. Kosloff. Propagation methods for quantum molecular dynamics. *Annu. Rev. Phys. Chem.*, 45:145–178, 1994.

[66] J. Tellinghuisen. The Franck–Condon principle in bound–free transitions. *Adv. Chem. Phys.*, 60:399, 1985.

[67] V. S. Dubov, L. I. Gudzenko, L. V. Gurvich, and S. I. Iakovlenko. On the effect of chemical radiative collisions. *Chem. Phys. Lett.*, 45:330–333, 1977.

[68] M.V. Korolkov and B. Schmidt. Vibrational state-selective laser pulse control of electronic branching in OH ($\sigma^2\pi/a^2\sigma^+$) photoassociation. *Chem. Phys.*, to be published.

[69] K. W. Ford, D. L. Hill, M. Wakano, and J. A. Wheeler. Quantum effects near a barrier maximum. *Ann. Phys.*, 7:239–258, 1959.

[70] M. Child. *Molecular Collision Theory*. Academic, London, 1974.

[71] J. P. Toennies, W. Weltz, and G. Wolf. Molecular beam scattering studies of orbiting resonances and the determination of the van der Waals potentials for H–Ne,Ar,Kr and for H_2–Ar, Kr, Xe. *J. Chem. Phys.*, 71:614, 1979.

[72] G. F. Adams and C. F. Chabalowski. Quantum chemical study of the potential energy curves and electronic transition strengths in HCl, XeCl, and HCl + Xe. *J. Phys. Chem.*, 98:5878–5890, 1994.

[73] J. F. Ogilvie, W. R. Rodwell, and R.H. Tipping. Dipole moment functions of the hydrogen halides. *J. Chem. Phys.*, 73:5221–5229, 1980.

[74] R. J. LeRoy. *Univerity of Waterloo Chemical Physics Research Report CP-555*, 1995.

[75] M. V. Korolkov and B. Schmidt. Infrared picosecond laser control of acceleration of neutral atoms: Model simulations for the collision pair O + H. *Chem. Phys. Lett.*, 272:96–102, 1997.

[76] G.C. Schatz and M.A. Ratner. *Quantum Mechanics in Chemistry*. Prentice Hall, Englewood Cliffs, 1993.

[77] L.V. Keldysh. Ionization in the field of a strong electromagnetic wave. *Sov. Phys. JETP*, 20:1307–1314, 1965.

[78] T. Joseph and J. Manz. Mode selective dissociation of vibrationally excited ABA molecular resonances stimulated by a picosecond infrared laser pulse. *Mol. Phys.*, 58:1149–1169, 1986.

[79] G. Scoles, editor. *Atomic and Molecular Beam Methods*, New York, 1988. Oxford University.

[80] R. D. Levine and R. B. Bernstein. *Molecular Reaction Dynamics and Chemical Reactivity*. Oxford University, Oxford, 1987.

[81] K. Balasubramanian, K. K. Das, and D. W. Liao. Spectroscopic constants and potential energy curves for Hg_2. *Chem. Phys. Lett.*, 195:487–493, 1992.

[82] J. Koperski, J. B. Atkinson, and L. Krause. The $O_u^+(6^3P_1) \leftarrow XO_g^+$ spectrum of Hg_2 in a supersonic jet. *Chem. Phys. Lett.*, 219:161–168, 1994.

[83] F. H. Mies, W. J. Stevens, and M. Krauss. Model calculation of the electronic structure and spectroscopy of Hg_2. *J. Mol. Spectr.*, 72:303, 1978.

[84] E. W. Smith, R. E. Drullinger, M. M. Hessel, and J. Cooper. A theoretical analysis of mercury molecules. *J. Chem. Phys.*, 66:5667–5681, 1977.

[85] G. Herzberg. *Spectra of Diatomic Molecules*. Van Nostrand–Reinhold, London, 1940.

[86] I. Sh. Averbukh and N. F. Perelman. Fractional revivals: Universality in the long–term evolution of quantum wave packets beyond the correspondence principle dynamics. *Phys. Lett. A*, 139:449–453, 1989.

[87] C. Leichtle, I.Sh. Averbukh, and W.P. Schleich. Multi-level quantum beats: An analytical approach. *Phys. Rev. A*, 54:5299–5312, 1996.

[88] M. Gruebele, G. Roberts, M. Dantus, R.M Bowman, and A.H. Zewail. Femtosecond temporal spectroscopy and direct inversion of the potential: Application to iodine. *Chem. Phys. Lett.*, 166:459–469, 1990.

[89] S. Baskin, P. M. Felker, and A. H. Zewail. Purely rotational coherence effect and time–resolved sub–Doppler spectroscopy of large molecules. II. Experimental. *J. Chem. Phys.*, 86:2483–2499, 1987.

[90] P. M. Felker and A. H. Zewail. Purely rotational coherence effect and time–resolved sub–Doppler spectroscopy of large molecules. I. Theoretical. *J. Chem. Phys.*, 86:2460–2482, 1987.

[91] B. Schmidt and R. B. Gerber. Solvation effects on association reactions in microclusters: Classical trajectory study of H+Cl(Ar)$_n$. *J. Chem. Phys.*, 101:343–355, 1994.

[92] W. Zhu, J. Botina, and H. Rabitz. Rapidly convergent iteration methods for quantum optimal control of population. *J. Chem. Phys.*, 108:1953–1963, 1998.