

BIBLIOGRAPHY

1. S. M. Arrivo, T. P. Dougherty, W. T. Grubbs, and E. J. Heilweil. Ultrafast infrared-spectroscopy of vibrational co-stretch up-pumping and relaxation dynamics of $\text{W}(\text{CO})_6$. *Chem. Phys. Lett.* **235**, 247–254 (1995).
2. P. W. Atkins. *Physical Chemistry*. Oxford University Press, Oxford, 1990.
3. M.-P. Bassez, J. Lee, and G. W. Robinson. Is liquid water really anomalous? *J. Phys. Chem.* **91**, 5818–5825 (1987).
4. N. Bloembergen, E. M. Purcell, and R. V. Pound. Relaxation effects in nuclear magnetic resonance absorption. *Phys. Rev.* **73**, 679–712 (1948).
5. M. Bonn, M. J. P. Brugmans, A. W. Kleyn, R. A. van Santen, and H. J. Bakker. Infrared picosecond transient hole-burning studies of the effect of hydrogen bonds on the vibrational line shape. *J. Chem. Phys.* **105**, 3431–3442 (1996).
6. T. A. Boyd. *Nonlinear Optics*. Academic Press Inc., San Diego, 1992.
7. S. Bratos. Profiles of hydrogen stretching IR bands of molecules with hydrogen bonds: a stochastic theory. I. Weak and medium strength hydrogen bonds. *J. Chem. Phys.* **63**, 3499–509 (1975).
8. S. Bratos and J.-C. Leicknam. Ultrafast infrared pump-probe spectroscopy of water: a theoretical description. *J. Chem. Phys.* **101**, 4536–4546 (1994).
9. S. Bratos and J.-C. Leicknam. Subpicosecond transient infrared-spectroscopy of water: a theoretical description. *J. Chem. Phys.* **103**, 4887–4893 (1995).
10. M. J. P. Brugmans, M. Bonn, H. J. Bakker, and A. Lagendijk. Multiphonon decay of stretch vibrations in zeolites. *Chem. Phys.* **201**, 215 (1995).
11. F. Bruni, M. A. Ricci, and A. K. Soper. Structural characterization of NaOH aqueous solution in the glass and liquid states. *J. Chem. Phys.* **114**, 8056–8063 (2001).
12. R. Buchner, G. Hefter, P. M. May, and P. Sipos. Dielectric relaxation of dilute aqueous NaOH, $\text{NaAl}(\text{OH})_4$, and $\text{NaB}(\text{OH})_4$. *J. Phys. Chem. A* **103**, 11186–11190 (1999).
13. A. I. Buhrshtein and V. S. Malinovsky. Free-induction decay in the framework of sudden-modulation theory. *J. Opt. Soc. Am. B* **8**, 1098–1113 (1991).
14. E. A. Carter and J. T. Hynes. Solvation dynamics for an ion-pair in a polar solvent: time-dependent fluorescence and photochemical charge-transfer. *J. Chem. Phys.* **94**, 5961–5979 (1991).

15. A. Chandra and T. Ichiye. Dynamical properties of the soft sticky dipole model of water: Molecular dynamics simulations. *J. Chem. Phys.* *111*, 2701 (1999).
16. Y. J. Chang and E. W. Castner. Fast responses from slowly relaxing liquids—a comparative-study of the femtosecond dynamics of triacetin, ethylene-glycol, and water. *J. Chem. Phys.* *99*, 7289–7299 (1993).
17. C. Chaudhuri, Y. S. Wang, J. C. Jiang, J. C. Jiang, Y. T. Lee, H. C. Chang, and G. Niedner-Schatteburg. Infrared spectra and isomeric structures of hydroxide ion-water clusters $\text{OH}^- (\text{H}_2\text{O})_{1-5}$: a comparison with $\text{H}_3\text{O}^+ (\text{H}_2\text{O})_{1-5}$. *Mol. Phys.* *99*, 1161–1173 (2001).
18. D. J. Cook and R. M. Hochstrasser. Intense terahertz pulses by four-wave rectification in air. *Opt. Lett.* *25*, 1210–1212 (2000).
19. G. Dahlquist, A. Björk, and N. Anderson. *Numerical methods*. Prentice-Hall, Eaglewood Cliffs, 1974.
20. C. J. T. de Grotthuss. Mémoire sur la décomposition de l'eau et des corps qu'elle tient en dissolution à l'aide de l'électricité galvanique. *Annales de Chimie* *58*, 54–74 (1806).
21. J. C. Deak, S. T. Rhea, L. K. Iwaki, and D. D. Dlott. Vibrational energy relaxation and spectral diffusion in water and deuterated water. *J. Phys. Chem. A* *104*, 4866–4875 (2000).
22. P. Debye. *Polar molecules*. Dover Publications, Inc., New York, 1929.
23. M. H. Dunn and M. Ebrahimzadeh. Parametric generation of tunable light from continuous-wave to femtosecond pulses. *Science* *286*, 1513–1517 (1999).
24. C. G. Durfee, S. Backus, M. M. Murnane, and H. C. Kapteyn. Ultrabroadband phase-matched optical parametric generation in the ultraviolet by use of guided waves. *Opt. Lett.* *22*, 1565–1567 (1997).
25. D. Eisenberg and W. Kauzmann. *The structure and properties of water*. Oxford University Press, New York, 1969.
26. K. Ekvall, P. van der Meulen, C. Dhollande, L.-E. Berg, S. Pommeret, R. Naskrecki, and J.-C. Mialocq. Cross phase modulation artifact in liquid phase transient absorption spectroscopy. *J. Appl. Phys.* *87*, 2340–2352 (2000).
27. U. Emmerichs, S. Woutersen, and H. J. Bakker. Generation of intense femtosecond optical pulses around $3 \mu\text{m}$ with kHz rep-rate. *J. Opt. Soc. Am. B* *14*, 1480 (1997).
28. T. A. Ford and M. Falk. Hydrogen bonding in water and ice. *Can. J. Chem.* *46*, 3579 (1968).
29. T. Förster. Transfer mechanisms of electronic excitation. *Discussions Faraday Soc.* *27*, 7–17 (1959).
30. F. Franks, editor. *Water: a comprehensive treatise*, volume 3. Plenum Press, New York, 1973.

31. F. Franks. *Water*. Royal Society of Chemistry, London, 1983.
32. L. E. Fried, N. Bernstein, and S. Mukamel. Simulation of the femtosecond optical-response of a solute in water. *Phys. Rev. Lett.* **68**, 1842–1845 (1992).
33. G. M. Gale, G. Gallot, F. Hache, N. Lascoux, S. Bratos, and J.-Cl. Leicknam. Femtosecond dynamics of hydrogen bonds in liquid water: a real time study. *Phys. Rev. Lett.* **82**, 1068–1071 (1999).
34. G. M. Gale, G. Gallot, F. Hache, and R. Sander. Generation of intense highly coherent femtosecond pulses in the mid infrared. *Opt. Lett.* **22**, 1253–1255 (1997).
35. G. Gallot. *Génération d'impulsions femtoseconde intenses, accordables dans l'infrarouge moyen. Dynamique de la liaison hydrogène dans l'eau liquide*. PhD thesis, Ecole Polytechnique, Palaiseau, France, 1998.
36. G. Gallot, N. Lascoux, G. M. Gale, J.-C. Leicknam, S. Bratos, and S. Pommeret. Non-monotonic decay of transient infrared absorption in dilute HDO/D₂O solutions. *Chem. Phys. Lett.* **341**, 535–539 (2001).
37. P. L. Geissler, C. Dellago, D. Chandler, J. Hutter, and M. Parrinello. Autoionization in liquid water. *Science* **291**, 2121–2124 (2001).
38. P. A. Giguère. Les liaisons hydrogène dans les solutions aqueuses d'alcalis. *Rev. Chim. Minérale* **20**, 588–594 (1983).
39. C. C. Gillispie, editor. *Dictionary of Scientific Biography*. Charles Scribner's Sons, New York, 1970.
40. D. M. Goodall and R. C. Greenhow. Ionization of water induced by vibrational excitation using a neodymium:glass laser. *Chem. Phys. Lett.* **9**, 583–86 (1971).
41. B. C. Gordalla and M. D. Zeidler. Molecular dynamics in the system water-dimethylsulphoxide: A N.M.R. relaxation study. *Mol. Phys.* **59**, 817–828 (1986).
42. H. Graener. The equilibration of vibrational excess energy. *Chem. Phys. Lett.* **165**, 110–114 (1990).
43. H. Graener and G. Seifert. Vibrational and orientational relaxation of monomeric water molecules in liquids. *Chem. Phys. Lett.* **98**, 35–45 (1992).
44. H. Graener, G. Seifert, and A. Laubereau. Direct observation of rotational relaxation times by time-resolved infrared spectroscopy. *Chem. Phys. Lett.* **172**, 435–439 (1990).
45. H. Graener, G. Seifert, and A. Laubereau. New spectroscopy of water using tunable picosecond pulses in the infrared. *Phys. Rev. Lett.* **66**, 2092–2095 (1991).
46. H. Graener, T. Q. Ye, and A. Laubereau. Ultrafast dynamics of hydrogen bonds directly observed by time-resolved infrared spectroscopy. *J. Chem. Phys.* **90**, 3413–3416 (1989).

47. B. Guillot. A molecular dynamics study of the far infrared spectrum of liquid water. *J. Chem. Phys.* 95, 1543–51 (1991).
48. P. Hamm, C. Lauterwasser, and W. Zinth. Generation of tunable subpicosecond light-pulses in the midinfrared between 4.5 and 11.5 μm . *Opt. Lett.* 18, 1943–1945 (1993).
49. P. Hamm, M. Lim, and R. M. Hochstrasser. Structure of the amide I band of peptides measured by femtosecond nonlinear-infrared spectroscopy. *J. Phys. Chem. B* 102(31), 6123–6138 (1998).
50. E. H. Hardy, A. Zygari, M. D. Zeidler, M. Holz, and F. D. Sacher. Isotope effect on the translational and rotational motion in liquid water and ammonia. *J. Chem. Phys.* 114, 3174–3181 (2001).
51. E. J. Heilweil, M. P. Casassa, R. R. Cavanagh, and J. C. Stephenson. Temperature dependence of the vibrational population lifetime of OH($\nu = 1$) in fused silica. *Chem. Phys. Lett.* 117, 185–189 (1985).
52. G. Herzberg. *Molecular spectra and molecular structure*. D. van Nostrand, New York, 1950.
53. J. C. Hindman, A. Svirnickas, and M. Wood. Relaxation processes in water. a study of the proton spin-lattice relaxation time. *J. Chem. Phys.* 59, 1517–1522 (1974).
54. J. D. Jackson. *Classical Electrodynamics*. John Wiley & Sons, Inc., New York, second edition, 1975.
55. J. Jonas, T. DeFries, and D. J. Wilbur. Molecular motions in compressed liquid water. *J. Chem. Phys.* 65, 582–588 (1976).
56. R. A. Kaindl, M. Wurm, K. Reimann, P. Hamm, A. M. Weiner, and M. Woerner. Generation, shaping, and characterization of intense femtosecond pulses tunable from 3 to 20 μm . *J. Opt. Soc. Am. B* 17, 2086–2094 (2000).
57. J. T. Kindt and C. A. Schmuttenmaer. Far-infrared dielectric properties of polar liquids probed by femtosecond terahertz pulse spectroscopy. *J. Phys. Chem.* 100, 10373–10379 (1996).
58. P. I. Klocek, editor. *Handbook of infrared optical materials*. Marcel Dekker, Inc., New York, 1991.
59. B. Knight, D. M. Goodall, and R. C. Greenhow. Single-photon vibrational photochemistry. *J. Chem. Soc. Faraday II* 75, 291–295 (1979).
60. S. A. Kovalenko, A. L. Dobryakov, J. Ruthmann, and et al. Femtosecond spectroscopy of condensed phases with chirped supercontinuum probing. *Phys. Rev. A* 59, 2369–2384 (1999).
61. D. Kroh and A. Ron. The overtone spectra of H₂O, D₂O, and mixtures of H₂O in D₂O ice. *Chem. Phys. Lett.* 36, 527–530 (1975).

62. M. F. Kropman and H. J. Bakker. Dynamics of water molecules in aqueous solvation shells. *Science* 291, 2118–2120 (2001).
63. R. Kubo, M. Toda, and N. Hashitsume. *Statistical Physics II: Nonequilibrium statistical mechanics*. Springer-Verlag, Berlin, 1995.
64. D.J. Kushner, Alison Baker, and T.G. Dunstall. Pharmacological uses and perspectives of heavy water and deuterated compounds. *Can. J. Physiology and Pharmacology* 77, 79–88 (1999).
65. R. Laenen, G. M. Gale, and N. Lascoux. IR spectroscopy of hydrogen-bonded methanol: vibrational and structural relaxation on the femtosecond time scale. *J. Phys. Chem. A* 103, 10708–10712 (1999).
66. R. Laenen and C. Rauscher. Transient hole-burning spectroscopy of associated ethanol molecules in the infrared: structural dynamics and evidence for energy migration. *J. Chem. Phys.* 106, 8974–8980 (1997).
67. R. Laenen, C. Rauscher, and A. Laubereau. Local substructures of water studied by transient hole-burning spectroscopy in the infrared: dynamics and temperature dependence. *J. Phys. Chem. B* 102, 9304–9311 (1998).
68. D. Lankhorst, J. Schriever, and J. C. Leyte. Determination of the rotational correlation time of water by proton NMR relaxation in H₂¹⁷O and some related results. *Ber. Bunsengesellschaft Phys. Chem.* 86, 215–221 (1982).
69. A. Laubereau, L. Greiter, and W. Kaiser. Intense tunable picosecond pulses in the infrared. *Appl. Phys. Lett.* 25, 87 (1974).
70. H. M. Leicester. *The historical background of chemistry*. John Wiley and Sons, New York, 1956. Republished in 1971 by Dover, New York.
71. F. O. Libnau, O. M. Kvalheim, A. A. Christy, and J. Toft. Spectra of water in the near- and mid-infrared region. *Vibrational Spectroscopy* 7, 243–254 (1994).
72. D. R. Lide, editor. *CRC Handbook of Chemistry and Physics*. CRC Press, Boca Raton, 75th edition, 1994.
73. E. R. Lippincott and R. Schroeder. One-dimensional model of the hydrogen bond. *J. Chem. Phys.* 23, 1099–1106 (1955).
74. A. J. Lock, S. Woutersen, and H. J. Bakker. Ultrafast energy equilibration in hydrogen-bonded liquids. *J. Phys. Chem. A* 105, 1238–1243 (2001).
75. W. A. P. Luck. The angular dependence of hydrogen bond interactions. In P. Schuster, G. Zundel, and C. Sandorfy, editors, *The Hydrogen Bond*, volume II, chapter 11. North Holland, Amsterdam, 1976.
76. W. A. P. Luck. Semiclassical model calculations of weak, strong, and short O–H···O H-bonds. *Can. J. Chem.* 69, 1819–1826 (1991).

77. H. D. Lutz. Bonding and structure of water-molecules in solid hydrates—correlation of spectroscopic and structural data. *Struct. Bond. (Berlin)* 69, 97–125 (1988).
78. D. Madsen, J. Stenger, J. Dreyer, E. T. J. Nibbering, P. Hamm, and T. Elsaesser. Coherent vibrational ground-state dynamics of an intramolecular hydrogen bond. *Chem. Phys. Lett.* 341, 56–62 (2001).
79. I. H. Malitson. Refraction and dispersion of synthetic sapphire. *J. Opt. Soc. Am.* 52, 1377–1379 (1962).
80. I. H. Malitson. A redetermination of some optical properties of calcium fluoride. *Appl. Opt.* 2, 1103–1107 (1963).
81. I. H. Malitson. Refractive properties of barium fluoride. *J. Opt. Soc. Am.* 54, 628 (1964).
82. Y. Marechal and A. Witkowski. Infrared spectra of H-bonded systems. *J. Chem. Phys.* 48, 3697–3703 (1968).
83. M. Maroncelli and G. R. Fleming. Computer-simulation of the dynamics of aqueous solvation. *J. Chem. Phys.* 89, 5044–5069 (1988).
84. D. Marx, M. E. Tuckerman, J. Hutter, and M. Parrinello. The nature of the hydrated excess proton in water. *Nature* 397, 601–604 (1999).
85. W. Mikenda. Stretching frequency versus bond distance correlation of O–D(H)···Y (Y = N, O, S, Se, Cl, Br, I) hydrogen bonds in solid hydrates. *J. Mol. Struct.* 147, 1–15 (1986).
86. R. E. Miller. The vibrational spectroscopy and dynamics of weakly bound neutral complexes. *Science* 240, 447 (1988).
87. M. Moskovits and K. M. Michaelian. Alkali hydroxide ion pairs. A Raman study. *J. Am. Chem. Soc.* 102, 2209–2215 (1980).
88. S. Mukamel. *Principles of nonlinear optical spectroscopy*. Oxford University Press, Oxford, 1991.
89. D. L. Myers, M. Shigeiwa, C. Stromberg, M. D. Fayer, and B. J. Cherayil. Temperature dependence of solute vibrational relaxation in supercritical fluids: experiment and theory. *Chem. Phys. Lett.* 325, 619–626 (2000).
90. A. Nitzan and J. Jortner. Vibrational relaxation of a molecule in a dense medium. *Mol. Phys.* 25, 713–734 (1973).
91. A. Nitzan, S. Mukamel, and J. Jortner. Energy gap law for vibrational relaxation of a molecule in a dense medium. *J. Chem. Phys.* 63, 200 (1975).
92. A. Novak. Hydrogen bonding in solids. correlation of spectroscopic and crystallographic data. *Struct. Bonding (Berlin)* 18, 177 (1974).

93. H. Okamoto and M. Tasumi. Generation of ultrashort light-pulses in the midinfrared ($3000\text{--}800\text{ cm}^{-1}$) by 4-wave-mixing. *Opt. Commun.* *121*, 63–68 (1995).
94. J. C. Owrutsky, M. Li, B. Locke, and R. M. Hochstrasser. Vibrational-relaxation of the CO stretch vibration in hemoglobin-CO, myoglobin-CO, and protoheme-CO. *J. Phys. Chem.* *99*, 4842–4846 (1995).
95. D. W. Oxtoby and S. A. Rice. On vibrational relaxation in liquids. *Chem. Phys. Lett.* *42*, 1–7 (1976).
96. S. Palese, L. Schilling, R. J. Dwayne Miller, P. Randall Staver, and W. T. Lotshaw. Femtosecond optical Kerr effect studies of water. *J. Phys. Chem.* *98*, 6308–6316 (1994).
97. V. Petrov and F. Noack. Tunable femtosecond optical parametric-amplifier in the midinfrared with narrow-band seeding. *J. Opt. Soc. Am. B* *12*, 2214–2221 (1995).
98. V. Petrov, F. Rotermund, F. Noack, and P. Schunemann. Femtosecond parametric generation in ZnGeP_2 . *Opt. Lett.* *24*, 414–416 (1999).
99. J. R. Pliego and J. M. Riveros. *Ab initio* study of the hydroxide ion–water clusters: an accurate determination of the thermodynamic properties for the processes $n\text{H}_2\text{O} + \text{OH}^- \rightarrow \text{HO}^-(\text{H}_2\text{O})_n$ ($n=1\text{--}4$). *J. Chem. Phys.* *112*, 4045–4052 (2000).
100. W. H. Press, S. A. Teukolsky, W. T. Vetterling, and B. P. Flannery. *Numerical recipes in C: the art of scientific computing*. Cambridge University Press, Cambridge, second edition, 1992.
101. G. N. Robertson and J. Yarwood. Vibrational relaxation of hydrogen-bonded species in solution. I. Theory. *Chem. Phys.* *32*, 267–282 (1978).
102. G. W. Robinson, C. H. Cho, and J. Urquidi. Isosbestic points in liquid water: further strong evidence for the two-state mixture model. *J. Chem. Phys.* *111*, 698–702 (1999).
103. C. Rønne, P.-O. Åstrand, and S. R. Keiding. THz spectroscopy of liquid H_2O and D_2O . *Phys. Rev. Lett.* *82*, 2888–2891 (1999).
104. C. Rønne, L. Thrane, P.-O. Åstrand, A. Wallqvist, K. V. Mikkelsen, and S. R. Keiding. Investigation of the temperature dependence of dielectric relaxation in liquid water by THz reflection spectroscopy and molecular dynamics simulation. *J. Chem. Phys.* *107*, 5319–5331 (1997).
105. J. Ropp, C. Lawrence, T. C. Farrar, and J. L. Skinner. Rotational motion in liquid water is anisotropic: A nuclear magnetic resonance and molecular dynamics simulation study. *J. Am. Chem. Soc.* *123*, 8047–8052 (2001).
106. M. Rozenberg, A. Loewenschuss, and Y. Marcus. An empirical correlation between stretching vibration redshift and hydrogen bond length. *Phys. Chem. Chem. Phys.* *2*, 2699–2702 (2000).

107. M. G. Sceats and S. A. Rice. The intramolecular potential of water molecules engaged in hydrogen bonding from analysis of the overtone spectrum of ice I. *J. Chem. Phys.* 71, 973–982 (1979).
108. D. Schiøberg and G. Zundel. Very polarisable hydrogen bonds in solutions of bases having infra-red absorption continua. *J. Chem. Soc. Faraday Transactions II* 69, 771–81 (1973).
109. Y. R. Shen. *The principles of nonlinear optics*. John Wiley & Sons, Inc., New York, 1984.
110. T. Shimanouchi, editor. *Tables of molecular vibrational frequencies consolidated*, volume I. National Bureau of Standards, Washington D.C., 1972.
111. D. W. G. Smith and J. G. Powles. Proton spin-lattice relaxation in liquid water and liquid ammonia. *Mol. Phys.* 10, 451–463 (1966).
112. R. J. Speedy and C. A. Angell. Isothermal compressibility of supercooled water and evidence for a thermodynamic singularity at -45°C . *J. Chem. Phys.* 65, 851–858 (1976).
113. M. Sprik, J. Hutter, and M. Parrinello. *Ab initio* molecular dynamics simulation of liquid water: Comparison of three gradient-corrected density functionals. *J. Chem. Phys.* 105, 1142–1152 (1996).
114. A. Staib and J. T. Hynes. Vibrational predissociation in hydrogen bonded OH...O complexes via OH stretch-OO stretch energy transfer. *Chem. Phys. Lett.* 204(1,2), 197–205 (1993).
115. J. Stenger, D. Madsen, P. Hamm, E. T. J. Nibbering, and T. Elsaesser. Ultrafast vibrational dephasing of liquid water. *Phys. Rev. Lett.* 87(2), 027401-1–027401-4 (2001).
116. L. Stryer. *Biochemistry*. W. H. Freeman and Co., New York, third edition, 1988.
117. M. E. Tuckerman, K. Laasonen, M. Sprik, and M. Parrinello. *Ab initio* molecular dynamics simulation of the solvation and transport of H_3O^+ and OH^- ions in water. *J. Phys. Chem.* 99, 5749–5752 (1995).
118. M. E. Tuckerman, K. Laasonen, M. Sprik, and M. Parrinello. *Ab initio* molecular dynamics simulation of the solvation and transport of hydronium and hydroxyl ions in water. *J. Chem. Phys.* 103, 150–161 (1995).
119. M. E. Tuckerman, D. Marx, M. L. Klein, and M. Parrinello. On the quantum nature of the shared proton in hydrogen bonds. *Science* 275, 817–820 (1997).
120. M. A. F. H. van den Broek and H. J. Bakker. Observation of a bottleneck in the vibrational relaxation of liquid bromoform. *Chem. Phys.* 253, 157–164 (2000).
121. M. A. F. H. van den Broek, H. K. Nienhuys, and H. J. Bakker. Vibrational dynamics of the C-O stretch vibration in alcohols. *J. Chem. Phys.* 114, 3182–3186 (2001).

122. D. van der Spoel, P. J. van Maaren, and H. J. C. Berendsen. A systematic study of water models for molecular simulation: derivation of water models optimized for use with a reaction field. *J. Chem. Phys.* *108*, 10220–10230 (1998).
123. A. Vegiri and S. V. Shevkunov. Hydration shell structure of the $\text{OH}^- (\text{H}_2\text{O})_{n=1-15}$ clusters from a model potential energy function. *J. Chem. Phys.* *113*, 8521–8530 (2000).
124. K. L. Vodopyanov. Saturation studies of H_2O and HDO near 3400 cm^{-1} using intense picosecond laser pulses. *J. Chem. Phys.* *94*, 5389–5393 (1991).
125. G. E. Walrafen. Raman spectral studies of the effects of temperature on water and electrolyte solutions. *J. Chem. Phys.* *44*, 1546–1558 (1966).
126. G. E. Walrafen. Raman spectral studies of the effects of perchlorate ion on water structure. *J. Chem. Phys.* *52*, 4176–4198 (1970).
127. D. Wei, E. I. Proynov, A. Milet, and D. R. Salahub. Solvation of the hydroxide anion: a combined DFT and molecular dynamics study. *J. Phys. Chem. A* *104*, 2384–2395 (2000).
128. K. Winkler, Jörg Lindner, H. Bürsing, and P. Vöhringer. Ultrafast Raman-induced Kerr-effect of water: single molecule versus collective motions. *J. Chem. Phys.* *113*, 4674–4682 (2000).
129. S. Woutersen and H. J. Bakker. The hydrogen bond in liquid water as a Brownian oscillator. *Phys. Rev. Lett.* *83*, 2077–2080 (1999).
130. S. Woutersen and H. J. Bakker. Resonant intermolecular transfer of vibrational energy in liquid water. *Nature* *402*, 507–509 (1999).
131. S. Woutersen and H. J. Bakker. Coherent coupling in frequency-resolved pump-probe spectroscopy. *J. Opt. Soc. Am. B* *17*, 827–832 (2000).
132. S. Woutersen, U. Emmerichs, and H. J. Bakker. Femtosecond mid-IR pump-probe spectroscopy of liquid water: Evidence for a two-component structure. *Science* *278*, 658–660 (1997).
133. S. Woutersen, U. Emmerichs, and H. J. Bakker. A femtosecond midinfrared pump-probe study of hydrogen bonding in ethanol. *J. Chem. Phys.* *107*, 1483 (1997).
134. S. Woutersen, U. Emmerichs, H. K. Nienhuys, and H. J. Bakker. Anomalous temperature dependence of vibrational lifetimes in water and ice. *Phys. Rev. Lett.* *81*, 1106–1109 (1998).
135. H. R. Wyss and M. Falk. Infrared spectrum of HDO in water and in NaCl solution. *Can. J. Chem.* *48*, 607 (1970).
136. A. Yariv. *Introduction to optical electronics*. CBS College Publishing, New York, 1985.
137. Y.-L. Yeh and C.-Y. Mou. Orientational relaxation dynamics of liquid water studied by molecular dynamics simulation. *J. Phys. Chem. B* *103*, 3699–3705 (1999).

138. R. N. Zare. *Angular Momentum: understanding spatial aspects in chemistry and physic.* John Wiley & Sons, 1988.
139. M. Ziolk, R. Naskrecki, M. Lorenc, J. Karolczak, J. Kubicki, and A. Maciejewski. The influence of the excitation geometry on the temporal resolution in femtosecond pump–probe experiments. *Opt. Comm.* 197, 467–473 (2001).