

7 Literaturverzeichnis

(Alameddin et al. 1992):

G. Alameddin, J. Hunter, D. Cameron und M. M. Kappes: *Electronic and geometric structure in silver clusters*. Chem. Phys. Lett. **192**, (1992) 122.

(Andrianov 1999):

I. Andrianov: *Simulations of Ultrafast Photoinduced Wave Packet Dynamics in Three Dimensions*. Dissertation, Freie Universität Berlin (1999).

(Andrianov et al. 1999):

I. Andrianov, V. Bonacic-Koutecky, M. Hartmann, J. Manz, J. Pittner und K. Sundermann: *Ab initio three dimensional quantum dynamics in NeNePo process*. Eingereicht bei Chem. Phys. Lett., (1999).

(Assion et al. 1998):

A. Assion, T. Baumert, M. Bergt, T. Brixner, B. Kiefer, V. Seyfried, M. Strehle und G. Gerber: *Control of Chemical Reactions by Feedback-Optimized Phase-Shaped Femtosecond Laser Pulses*. Science **282**, (1998) 919-922.

(Averbukh et al. 1989):

I. S. Averbukh und N. F. Perelman: *Fractional Revivals: Universality in the long-term Evolution of Quantum Wave Packets beyond the Correspondence Principle Dynamics*. Phys. Lett. A **139** (9), (1989) 449-453.

(Balasubramanian et al. 1989):

K. Balasubramanian und P. Y. Feng: *The ionization potentials of Ag_n and Au_n and binding energies of Ag_n , Au_n , Ag_n^+ and Au_n^+ ($n=1-4$)*. Chem. Phys. Lett. **159** (5-6), (1989) 452-8.

(Bauschlicher et al. 1990):

C. W. Bauschlicher, Jr., S. R. Langhoff und H. Partridge: *Theoretical study of the homonuclear tetramers and pentamers of the group IB metals (Cu, Ag, and Au)*. J. Chem. Phys. **93** (11), (1990) 8133-7.

(Beres 1997):

A. Berces: *The structures and vibrational frequencies of small clusters of transition metal and main group elements: A gradient corrected density functional study*. Spectrochimica Acta Part A **53**, (1997) 1257-1272.

(Berkowitz 1979):

J. Berkowitz: *Photoabsorption, Photoionization, and Photoelectron Spectroscopy*. Academic Press, New York (1979).

(Bonacic-Koutecky et al. 1993):

V. Bonacic-Koutecky, L. Cespiva, P. Fantucci und J. Koutecky: *Effective core potential-configuration interaction study of electronic structure and geometry of small neutral and cationic Ag_n clusters: predictions and interpretation of measured properties*. J. Chem. Phys. **98** (10), (1993) 7981-94.

(Bonacic-Koutecky et al. 1994):

V. Bonacic-Koutecky, L. Cespiva, P. Fantucci, J. Pittner und J. Koutecky: *Effective core potential-configuration interaction study of electronic structure and geometry of small anionic Ag_n clusters: Predictions and interpretation of photodetachment spectra*. J. Chem. Phys. **100** (1), (1994) 490-506.

(Bonacic-Koutecky et al. 1999):

V. Bonacic-Koutecky, J. Pittner, M. Boiron und P. Fantucci: *An accurate relativistic effective core potential for excited states of Ag atom: An application for studying the absorption spectra of Ag_n and Ag_n^+ clusters*. J. Chem. Phys. **110** (8), (1999) 3876-3885.

(Boo et al. 1997):

D. W. Boo, Y. Ozaki, L. H. Andersen und C. Lineberger: *Femtosecond dynamics of linear Ag_3* . J. Phys. Chem. A **101** (36), (1997) 6688-96.

(BW-Tek 1999):

BW-Tek (1999). Beta-Barium Borate (BBO). <http://www.bwtek.com/bbo.html>.

(Cramer 1993):

F. Cramer: *Chaos and Order*. VCH Weinheim (1993).

(Das et al. 1991):

K. K. Das und K. Balasubramanian: *Electron affinities of Ag_4 and Au_4* . Chem. Phys. Lett. **176** (6), (1991) 571-4.

(Dolnikowski et al. 1988):

G. G. Dolnikowski, M. J. Kristo, C. G. Enke und J. T. Watson: *Ion-trapping technique for ion/molecule reaction studies in the center quadrupole of a triple quadrupole mass spectrometer*. Int. J. Mass Spectrom. Ion. Proc. **82**, (1988) 1-15.

(Ervin et al. 1985):

K. M. Ervin und P. B. Armentrout: *Energy dependence of the $Ar^+ + XY \rightarrow ArX^+ + Y$* . J. Chem. Phys. **83** (1), (1985) 167.

(Fayet et al. 1986):

P. Fayet, J. P. Wolf und L. Wöste: *Temperature measurement of sputtered metal dimers.* Phys. Rev. B **33** (10), (1986) 6792-6797.

(Felker et al. 1988):

P. M. Felker und A. H. Zewail: *Picosecond time-resolved dynamics of vibrational-energy redistribution and coherence in beam-isolated molecules.* Adv. Chem. Phys. **70**, (1988) 265.

(Ganteför et al. 1990):

G. Ganteför, M. Gausa , K.-H. Meiwes-Broer und H. O. Lutz: *Photoelectron Spectroscopy of Silver and Palladium Cluster Anions.* J. Chem. Soc. Faraday Trans. **86** (13), (1990) 2483-2488.

(Gaspard et al. 1997):

P. Gaspard und I. Burghardt: *Chemical reactions and their control on the femtosecond time scale.* Wiley New York (1997).

(Gerlich 1992):

D. Gerlich: *Inhomogeneous RF Fields: A versatile tool for the study of processes with slow ions.* Adv. in Chem. Phys. **LXXXII** , (1992) 1.

(Gerlich 1993):

D. Gerlich: *Guided ion beams, RF ion traps, and merged beams: state specific ion-molecule reactions at meV energies.* AIP Conference Proceedings **295** , (1993) 607-622.

(Gruebele et al. 1990):

M. Gruebele, G. Roberts, M. Dantus, R. M. Bowman und Z. A. H.: *Femtosecond temporal spectroscopy and direct inversion to the potential: Application to iodine.* Chem. Phys. Lett. **166** (5,6), (1990) 459-468.

(Gruebele et al. 1993):

M. Z. Gruebele, A. H. Zewail: *Femtosecond wave packet spectroscopy: Coherences, the potential, and structural determination.* J. Chem. Phys. **98** (2), (1993) 883-902.

(Handschoh et al. 1995):

H. Handschuh, C.-Y. Cha, P. S. Bechthold, G. Ganteför und W. Eberhardt: *Electronic shells or molecular orbitals: photoelectron spectra of Ag_n- clusters.* J. Chem. Phys. **102** (16), (1995) 6406.

(Harbich et al. 1990):

W. Harbich, S. Fedrigo und F. Meyer: *Deposition of mass selected silver clusters in rare gas matrices.* J. Chem. Phys. **93** (12), (1990) 8535-43.

(Hartmann 1999):

M. Hartmann: *Persönliche Mitteilung*.

(Hartmann et al. 1998):

M. Hartmann, A. Heidenreich, J. Pittner, V. Bonacic-Koutecky und J. Jortner:
Ultrafast dynamics of small clusters on the time scale of nuclear motion.
J. Phys. Chem. A **102** (23), (1998) 4069-74.

(Hartmann et al. 1998):

M. Hartmann, J. Pittner, V. Bonacic-Koutecky, A. Heidenreich und J. Jortner:
Theoretical exploration of femtosecond multi-state nuclear dynamics of small clusters.
J. Chem. Phys. **108** (8), (1998) 3096-113.

(Herzberg 1950):

G. Herzberg: *Spectra of Diatomic Molecules*. Van Nostrand Reinhold Ltd. New York (1950).

(Ho et al. 1990):

J. Ho, K. M. Ervin und W. C. Lineberger: *Photoelectron spectroscopy of metal cluster anions: Cu_n^- , Ag_n^- , and Au_n^-* . J. Chem. Phys. **93** (10), (1990) 6987-7002.

(Hortig et al. 1969):

G. Hortig und M. Müller: *Multiatomic Clusters Emerging from a Metal Surface Under Ion Bombardment*. Z. Physik **221**, (1969) 119-121.

(Huang 1964):

K. Huang: *Statistische Mechanik*. Bibl. Inst., Mannheim (1964).

(Jackschath et al. 1992):

C. Jackschath, I. Rabin und W. Schulze: *Electron impact ionization of silver clusters Ag_n , $n < 36$* . Z. Phys. D **22**, (1992) 517-520.

(Jeschke et al. 1996):

H. O. Jeschke, M. E. Garcia und K. H. Bennemann: *Analysis of the ultrafast dynamics of the silver trimer upon photodetachment*. Journal of Physics B **29** (14), (1996) L545-9.

(Jeschke et al. 1996):

H. O. Jeschke, M. E. Garcia und K. H. Bennemann: *Theory for the ultrafast structural response of optically excited small clusters: time dependence of the ionization potential*. Phys. Rev. A **54** (6), (1996) R4601-4.

(Keller et al. 1984):

R. Keller, F. Nöhmayer, P. Spädtke und M.-H. Schönenberg: *CORDIS - an improved high-current ion source for gases*. Vacuum **34** (1-2), (1984) 31-35.

(Koch et al. 1994):

D. Koch, M. Wahl und A. Wucher: *Electron impact and single photon ionization cross sections of neutral silver clusters*. Z. Phys. D **32**, (1994) 137-144.

(Korsch et al. 1996):

H. J. Korsch und H. Wiescher: *Quantum Chaos*. In: *Quantum Chaos*. K. H. Hoffmann und M. Schreiber (Hrsg.). Springer, Heidelberg (1996), 225-244.

(Krämer 1993):

B. Krämer : *Der "Phasenraumkompressor": eine neuartige Methode zur Erzeugung eines intensiven Strahls von Metallclusterionen*. Berlin, Freie Universität Berlin (1993).

(Krohn 1962):

V. E. Krohn: *Emission of Negative Ions from Metal Surfaces Bombarded by Positive Cesium Ions*. Journal of Applied Physics **33** (12), (1962) 3523-3525.

(Leisner et al. 1999):

T. Leisner, S. Vajda, S. Wolf, L. Wöste und R. S. Berry: *The relaxation from linear to triangular Ag₃ probed by femtosecond resonant two-photon ionization*. J. Chem. Phys. **111** (3), (1999) 1017-21.

(Lupulescu 1999):

C. Lupulescu : *Fragmentation of Homogenous and Heterogeneous Alkali Clusters*. Diplomarbeit, Freie Universität Berlin (1999).

(Manz et al. 1998):

J. Manz, K. Sundermann und R. de Vivie-Riedle: *Quantum optimal control strategies for photoisomerization via electronically excited states*. Chem. Phys. Lett. **290**, (1998) 415-422.

(Manz et al. 1995):

J. Manz und L. Wöste, Hrsg.: *Femtosecond Chemistry*. VCH, Weinheim (1995).

(Metz et al. 1992):

R. B. Metz, S. E. Bradforth und D. M. Neumark: *Transition State Spectroscopy of Bimolecular Reactions using Negative Ion Photodetachment*. Adv. in Chem. Phys. **LXXXI**, (1992) 1.

(Neumark 1993):

D. M. Neumark: *Transition-State Spectroscopy via Negative Ion Photodetachment.* Acc. Chem. Res. **26** (2), (1993) 33-39.

(Pittner 1997):

J. Pittner: Persönliche Mitteilung.

(Poincare 1892):

H. Poincare: *Les Methodes Nouvelles de la Mecanique Celeste.* Paris (1892).

(Poppe et al. 1998):

A. Poppe, L. Xu, F. Krausz und C. Spielmann: *Noise characterization of sub-10-fs Ti:sapphire oscillators.* IEEE Journal of Selected Topics in Quantum Electronics **4** (2), (1998) 179-184.

(Poteau et al. 1997):

R. Poteau, J. L. Heully und F. Spiegelmann: *Structure, stability, and vibrational properties of small silver clusters.* Z. Phys. D **40** (1-4), (1997) 479-482.

(Potter et al. 1992):

E. D. Potter, J. L. Herek, S. Pedersen, Q. Liu und A. H. Zewail: *Femtosecond laser control of a chemical reaction.* Nature **355**, (1992) 66-68.

(Robinson et al. 1972):

P. J. Robinson und K. A. Holbrook: *Unimolecular Reactions.* Wiley, New York (1972).

(Rutz 1996):

S. Rutz : *Femtosekundenspektroskopie zur Wellenpaketdynamik in Alkalidimeren und -trimeren.* Dissertation, Freie Universität Berlin (1996).

(Rutz et al. 1996):

S. Rutz, S. Greschik, E. Schreiber und L. Wöste: *Femtosecond wave packet propagation in spin-orbit coupled electronic states of the Na₂ molecule.* Chem. Phys. Lett. **257**, (1996) 365-373.

(Salin et al. 1987):

F. Salin, P. Goerges, G. Roger und A. Brun: *Single-shot measurement of a 52-fs pulse.* Applied Optics **26** (21), (1987) 4528-4531.

(Salin et al. 1993):

F. Salin, J. Squier, G. Mourou, G. Vaillancourt und M. Bouvier: *Amplification of a Femtosecond Pulses at 10-kHz Repetition Rates in Ti:Al₂O₃.* Opt. Lett. **18**, (1993) 625.

(Schlag et al. 1993):

E. W. Schlag, W. B. Peatman und K. Müller-Dethlefs: *Threshold photoionization and ZEKE spectroscopy: a historical perspective.* Journal of Electron Spectroscopy and Related Phenomena **66**, (1993) 139-149.

(Schmidt et al. 1997):

M. Schmidt, R. Kusche, W. Kronmüller, B. von Issendorff und H. Haberland: *Experimental determination of the melting point and heat capacity for a free cluster of 139 sodium atoms.* Phys. Rev. Lett. **79** (1), (1997) 99-102.

(Schreiber 1998):

E. Schreiber: *Femtosecond Real-Time Spectroscopy of Small Molecules and Clusters.* Springer, Heidelberg (1998).

(Seideman et al. 1989):

T. Seideman, M. Shapiro und P. Brumer: *Coherent radiative control of unimolecular reactions: Selective bond breaking with picosecond pulses.* J. Chem. Phys. **90** (12), (1989) 7132-7136.

(Stert et al. 1999):

V. Stert, P. Farmanara, W. Radloff, F. Noack, S. Skowronek, J. Jimenez und A. Gonzalez-Urena: *Real-time study of the femtosecond harpooning reaction of Ba...FCH₃.* Phys. Rev. A **59** (3), (1999) R1727-1730.

(Tannor et al. 1986):

D. J. Tannor, R. Kosloff und S. A. Rice: *Coherent pulse sequence induced control of selectivity of reactions: Exact quantum mechanical calculations.* J. Chem. Phys. **85** (10), (1986) 5805-5820.

(Tannor et al. 1985):

D. J. Tannor und S. A. Rice: *Control of Selectivity of Chemical Reactions via Wave Packet Evolution.* J. Chem. Phys. **83**, (1985) 5013.

(Vajda et al. 1998):

S. Vajda, S. Wolf, U. Busolt, H. Hess, T. Leisner und L. Wöste: *Time-Resolved Observation of Geometrical Reorientations of Metal Clusters.* Chem. Phys. **63**, (1998) 482-484.

(Westergren et al. 1997):

J. Westergren, H. Gronbeck, S.-G. Kim und D. Tomanek: *Noble gas temperature control of metal clusters: a molecular dynamics study.* J. Chem. Phys. **107** (8), (1997) 3071-9.

(Westergren et al. 1998):

J. Westergren, H. Gronbeck, A. Rosen und S. Nordholm: *Statistical theory of cluster cooling in rare gas. I. Energy transfer analysis for palladium clusters in helium.* J. Chem. Phys. **109** (22), (1998) 9848-58.

(Wolf 1997):

S. Wolf: *Zeitaufgelöste Spektroskopie an Silberclustern.* Dissertation, Freie Universität Berlin (1997).

(Wolf et al. 1995):

S. Wolf, G. Sommerer, S. Rutz, E. Schreiber, T. Leisner und L. Wöste: *Spectroscopy of size-selected neutral clusters; femtosecond evolution of neutral silver trimers.* Phys. Rev. Lett. **74** (21), (1995) 4177-4180.

(Yannouleas et al. 1998):

C. Yannouleas und U. Landman: *Molecular dynamics in shape space and femtosecond vibrational spectroscopy of metal clusters.* J. Phys. Chem. A **102** (15), (1998) 2505-8.

(Zare 1998):

R. N. Zare: *Laser Control of Chemical Reactions.* Science **279**, (1998) 1875-1878.

(Zewail 1991):

A. H. Zewail: *Femtosecond Transition-state Dynamics.* Faraday Discuss. Chem. Soc. **91**, (1991) 207-237.

(Zewail 1996):

A. H. Zewail: *Femtochemistry: Recent Progress in Studies of Dynamics and Control of Reactions and Their Transition States.* J. Phys. Chem. **100** (31), (1996) 12701-12724.