

List of Publications

Peer reviewed journals

- [J53] T. Palm and P. Nalbach
Suppressing relaxation through dephasing
[Phys. Rev. A 103, 022206 \(2021\)](#)
- [J52] H.-G. Duan, P. Nalbach, R. J. D. Miller, and M. Thorwart
Intramolecular vibrations enhance quantum efficiency of excitonic energy transfer
[Photosynth. Res. 144, 137 \(2020\)](#)
- [J51] T. Palm and P. Nalbach
Dephasing and relaxational polarized sub-Ohmic baths acting on a two-level system
[J. Chem. Phys. 150, 234108 \(2019\)](#)
- [J50] H.-G. Duan, P. Nalbach, R. J. D. Miller, and M. Thorwart
Ultrafast energy transfer in excitonically-coupled molecules induced by a nonlocal Peierls phonon
[J. Phys. Chem. Lett. 10, 1206 \(2019\)](#)
- [J49] H. Kirchberg, P. Nalbach, C. Bressler, and M. Thorwart
Spectroscopic Signatures of the Dynamical Hydrophobic Solvation Shell Formation
[J. Phys. Chem. B 123, 2106 \(2019\)](#)
- [J48] T. Palm and P. Nalbach
Quasi-adiabatic path integral approach for quantum systems under the influence of multiple non-commuting fluctuations
[J. Chem. Phys. 149, 214103 \(2018\)](#)
- [J47] P. Nalbach and V. Leyton
Magnus expansion for a chirped quantum two-level system
[Phys. Rev. A 98, 023855 \(2018\)](#)
- [J46] M. Schechter, P. Nalbach, and A. L. Burin
Nonuniversality and strongly interacting two-level systems in glasses at low temperatures
[New J. Phys. 20, 063048 \(2018\)](#).
- [J45] Henning Kirchberg, Peter Nalbach, and Michael Thorwart
Nonequilibrium quantum solvation with a time-dependent Onsager cavity
[J. Chem. Phys. 148, 164301 \(2018\)](#)
- [J44] P. Nalbach, N. Klinkenberg, T. Palm and N. Müller
Environmental rocking ratchet: Environmental rectification by a harmonically driven

- avoided crossing*
[Phys. Rev. E 96, 042134 \(2017\)](#)
- [J43] T. Palm and P. Nalbach
Nonperturbative environmental influence on dephasing
[Phys. Rev. A 96, 032105 \(2017\)](#)
- [J42] Peter Nalbach, Samaneh Javanbakht, Christopher Stahl, and Michael Thorwart
Stueckelberg oscillations in a two-state two-path model of a conical intersection
[Ann. Phys. 529, 1600147 \(2017\)](#).
(Topical Issue on *Quantum Dynamics: Exploring the Extremes*)
- [J41] P. Nalbach and M. Schechter
Symmetry reduction for tunneling defects due to strong couplings to phonons
[New J. Phys. 19, 063030 \(2017\)](#).
- [J40] Hong-Guang Duan, Moritz Frey, Michael Thorwart, and Peter Nalbach
Two-dimensional photon echoes reveal non-Markovian energy transfer in an excitonic dimer
[Phys. Rev. E 94, 052146 \(2016\)](#).
- [J39] J. Reichert, P. Nalbach, and M. Thorwart
Dynamics of a quantum two-state system in a linearly driven quantum bath
[Phys. Rev. A 94, 032127 \(2016\)](#).
- [J38] Hermann Grabert, Peter Nalbach, Joscha Reichert, and Michael Thorwart
Nonequilibrium Response of Nanosystems Coupled to Driven Quantum Baths
[J. Phys. Chem. Lett. 7, 2015 \(2016\)](#).
- [J37] J. Brüggemann, S. Weiss, P. Nalbach, and M. Thorwart
Exploiting the magnetomechanical interaction for cooling magnetic molecular junctions by spin-polarized currents
[New J. Phys. 18, 023026 \(2016\)](#).
- [J36] Hong-Guang Duan, Arend G. Dijkstra, Peter Nalbach, and Michael Thorwart
An efficient tool to calculate two-dimensional optical spectra for photoactive molecular complexes
[Phys. Rev. E 92, 042708 \(2015\)](#).
- [J35] Hong-Guang Duan, Amy Stevens, Peter Nalbach, Michael Thorwart, Valentyn Prokhorenko, and R.J. Dwayne Miller
Two-dimensional electronic spectroscopy of Light Harvesting Complex II at ambient temperature: a joint experimental and theoretical study
[J. Phys. Chem. B 119, 12017 \(2015\)](#).
- [J34] P. Nalbach, Smitha Vishveshwara, and Aashish A. Clerk
Quantum Kibble-Zurek physics in the presence of spatially-correlated dissipation
[Phys. Rev. B 92, 014306 \(2015\)](#).
- [J33] C. A. Mujica-Martinez and P. Nalbach
On the influence of underdamped vibrations on coherence and energy transfer times in light-harvesting complexes
[Ann. d. Physik \(Berlin\) 527, p. 592 - 600 \(2015\)](#).
(Special Issue on *Complex quantum systems*)

- [J32] Hong-Guang Duan, Peter Nalbach, Valentyn I. Prokhorenko, Shaul Mukamel, and Michael Thorwart
On the nature of oscillations in two-dimensional spectra of excitonically-coupled molecular systems
[New J. Phys. 17, 072002 \(2015\) \(Fast Track Communication\)](#).
- [J31] S. Javanbakht, P. Nalbach, and M. Thorwart
Dissipative Landau-Zener quantum dynamics with transversal and longitudinal noise
[Phys. Rev. A 91, 052103 \(2015\)](#).
- [J30] P. Nalbach, C. A. Mujica-Martinez, and M. Thorwart
Vibronic speed-up of the excitation energy transfer in the Fenna-Matthews-Olson complex
[Phys. Rev. E 91, 022706 \(2015\)](#).
- [J29] N. Mann, P. Nalbach, S. Mukamel, and M. Thorwart
Probing chirality fluctuations in molecules by nonlinear optical spectroscopy
[J. Chem. Phys. 141, 234305 \(2014\)](#).
- [J28] P. Nalbach
Adiabatic-Markovian Bath Dynamics at avoided crossings
[Phys. Rev. A 90, 042112 \(2014\)](#).
- [J27] J. Brüggemann, S. Weiss, P. Nalbach, and M. Thorwart
Cooling a magnetic nanoisland by spin-polarized currents
[Phys. Rev. Lett. 113, 076602 \(2014\)](#).
highlighted in *Physics*
[Katherine Kornei, Synopsis: Spin Currents Cool a Quantum Dot, Physics August 14, 2014](#)
highlighted in *Popular Mechanics*
[William Herkewitz, How the Computer of the Future Keeps its Cool, Popular Mechanics August 25, 2014](#)
- [J26] P. Nalbach, A.J.A. Achner, M. Frey, M. Grosser, C. Bressler, and M. Thorwart
Hydration shell effects in the relaxation dynamics of photoexcited Fe-II complexes in water
[J. Chem. Phys. 141, 044304 \(2014\)](#).
- [J25] C. Mujica-Martinez, P. Nalbach, and M. Thorwart
Quantification of non-Markovian effects in the Fenna-Matthews-Olson complex
[Phys. Rev. E 88, 062719 \(2013\)](#).
- [J24] D. Pagel, P. Nalbach, A. Alvermann, H. Fehske, and M. Thorwart
Nonequilibrium quantum fluctuation relations for harmonic systems in nonthermal environments
[New J. Phys. 15, 105008 \(2013\)](#).
- [J23] C. A. Mujica-Martinez, P. Nalbach, and M. Thorwart
Coherent control of molecular charge-qubits based on organic π -conjugated copolymers
[Phys. Rev. Lett. 111, 016802 \(2013\)](#).
Erratum: [Phys. Rev. Lett. 113, 139903 \(2014\)](#).
- [J22] P. Nalbach, J. Knörzer, and S. Ludwig
Nonequilibrium Landau-Zener-Stueckelberg spectroscopy in a double quantum dot
[Phys. Rev. B 87, 165425 \(2013\)](#).

- [J21] P. Nalbach and M. Thorwart
Enhanced quantum efficiency of light-harvesting in a biomolecular quantum 'steam engine'
[Proc. Natl. Acad. Sci. USA **110**, 2693 \(2013\)](#) (invited commentary).
- [J20] P. Nalbach and M. Thorwart
Crossover from coherent to incoherent quantum dynamics due to purely dephasing Sub-Ohmic fluctuations
[Phys. Rev. B **87**, 014116 \(2013\)](#).
- [J19] P. Nalbach, I. Pugliesi, H. Langhals, and M. Thorwart
Noise-induced Förster resonant energy transfer between orthogonal dipoles in photoexcited molecules
[Phys. Rev. Lett. **108**, 218302 \(2012\)](#).
- [J18] P. Nalbach and M. Thorwart
The role of discrete molecular modes in the coherent exciton dynamics in FMO
[J. Phys. B: At. Mol. Opt. Phys. **45**, 154009 \(2012\)](#).
(Special Issue on *Loss of Coherence and Memory Effects in Quantum Dynamics*)
- [J17] P. Nalbach, D. Braun, and M. Thorwart
Exciton dynamics and Quantumness of energy transfer in the Fenna-Matthews-Olson complex
[Phys. Rev. E **84**, 041926 \(2011\)](#).
- [J16] P. Nalbach, A. Ishizaki, G.R. Fleming, and M. Thorwart
Iterative path-integral algorithm versus cumulant time-nonlocal master equation approach for the dissipative biomolecular exciton transport
[New J. of Phys. **13**, 063040 \(2011\)](#).
- [J15] P. Nalbach, J. Eckel, and M. Thorwart
Quantum coherent biomolecular energy transfer with spatially correlated fluctuations
[New J. of Phys. **12**, 065043 \(2010\)](#).
(Focus issues on *Quantum Effects and Noise in Biomolecules*)
- [J14] P. Nalbach and M. Thorwart
Competition between relaxation and external driving in the dissipative Landau-Zener problem
[Chem. Phys. **375**, 234 \(2010\)](#).
(Spezial Issue on *Stochastic processes in Physics and Chemistry* dedicated to the 60th birthday of Peter Hänggi)
- [J13] P. Nalbach and M. Thorwart
Multiphonon transitions in the biomolecular energy transfer dynamics
[J. Chem. Phys. **132**, 194111 \(2010\)](#).
selected for the Virtual Journal of Biological Physics Research 19(11) (2010).
- [J12] P. Nalbach and M. Thorwart
Ultraslow quantum dynamics in a sub-Ohmic heat bath
[Phys. Rev. B **81**, 054308 \(2010\)](#).
- [J11] P. Nalbach and M. Thorwart
Landau Zener transitions in a dissipative environment: Numerically exact results
[Phys. Rev. Lett. **103**, 220401 \(2009\)](#).

- [J10] M. Thorwart, J. Eckel, J.H. Reina, P. Nalbach, and S. Weiss
Enhanced quantum entanglement in the non-Markovian dynamics of biomolecular excitons
[Chem. Phys. Lett. **478**, 234-237 \(2009\).](#)
- [J9] P. Nalbach
Microscopic structure of tunneling systems in glasses
[Phys. Rev. B **71**, 052201 \(2005\).](#)
- [J8] P. Nalbach, D.D. Osheroff, and S. Ludwig
Non-equilibrium dynamics of interacting tunneling states in glasses
[J. of Low Temp. Phys. **137**, 395 \(2004\).](#)
- [J7] P. Nalbach and W. Harrison
Particle tunneling through a polarizable insulator
[Phys. Rev. B **68**, 165309 \(2003\).](#)
- [J6] S. Ludwig, D. Rosenberg, P. Nalbach, and D.D. Osheroff
Dynamics of the Destruction and Rebuilding of a Dipole Gap in glasses
[Phys. Rev. Lett. **90**, 105501 \(2003\).](#)
- [J5] D. Rosenberg, P. Nalbach, and D.D. Osheroff
Memory Effects in Amorphous Solids below 20 mK
[Phys. Rev. Lett. **90**, 195501 \(2003\).](#)
see supplementary material: P. Nalbach, arXiv:0301003.
- [J4] P. Nalbach
Weakly coupled tunneling systems in mixed crystals
[Phys. Rev. B **66**, 134107 \(2002\).](#)
- [J3] P. Nalbach, O. Terzidis, K.A. Topp, and A. Würger
Elastic response of [111]-tunneling impurities
[J. Phys.: Condens. Matter **13**, 1467-83 \(2001\).](#)
- [J2] B. Thimmell, P. Nalbach, and O. Terzidis
Rotating wave approximation: systematic expansion and application to coupled spin pairs
[Eur. Phys. J. B **9**, 207-214 \(1999\).](#)
- [J1] P. Nalbach and O. Terzidis
Cubic defects: comparing the eight-state system with its two-level approximation
[J. Phys.: Condens. Matter **9**, 8561-77 \(1997\).](#)

Conference Proceedings

- [C4] P. Nalbach
Coherent or hopping like energy transfer in the chlorosome ?
[AIP Conf. Proc. **1610**, 135 \(2014\).](#)
- [C3] C. Mujica-Martinez, P. Nalbach and M. Thorwart
Nonequilibrium Quantum Dynamics of Biomolecular Excitons
in *Nonlinear Phenomena in Complex Systems: From Nano to Macro*, Proceedings of the NATO Advanced Research Workshop "New Challenges in Complex System Physics", Samarkand May 2013, Springer "NATO Science for Peace and Security Series - C: Environmental Security" (Springer, Berlin 2014).
- [C2] P. Nalbach and M. Thorwart, *Quantum Coherence in Photosynthetic Exciton Dynamics*, [J. Phys.: Conf. Ser. **376**, 012025 \(2012\).](#)
- [C1] P. Nalbach
Dephasing of interacting tunneling systems
[Physica B: Condensed Matter **316-317**, 503-505 \(2002\).](#)

Book contributions

- [B2] P. Nalbach
Ultrafast Exciton Dynamics in Correlated Environments
as Chapter 7 in *Ultrafast Dynamics at the Nanoscale – Biomolecules and Supramolecular Assemblies*, Edited by I. Burghardt and S. Haacke, Pan Stanford Publishing 2017
- [B1] P. Nalbach and M. Thorwart
Quantum coherence and entanglement in photosynthetic light-harvesting complexes
in *Quantum Efficiency in Complex Systems, Part I: Biomolecular systems*, Semiconductors and Semimetals Vol. 83, E. Weber, M. Thorwart, and U. Würfel (eds.), Academic Press 2010

Theses

- [T3] P. Nalbach, *Nonequilibrium Quantum Dynamics in Correlated Environments*
Habilitation, Universität Hamburg, Fachbereich Physik, April 2013
- [T2] P. Nalbach, *Dynamik von Tunneldefekten – Der [111] - Defekt*
Dissertation, Ruprecht-Karls Universität Heidelberg, Fakultät für Physik und Astronomie, Dezember 1999
- [T1] P. Nalbach, *Tunnelsysteme in kubischer Symmetrie*
Diplomarbeit, Ruprecht-Karls Universität Heidelberg, Fakultät für Physik und Astronomie, September 1996