

Thomas Elsaesser

Publications in refereed journals and books

October 22, 2023

549. **Nonlinear terahertz polarizability of electrons solvated in a polar liquid**
M. Runge, K. Reimann, M. Woerner, and T. Elsaesser
Phys. Rev. Lett. **131**, 166902 (2023)
548. **Ultrafast carrier dynamics and symmetry reduction in bismuth by non-perturbative optical excitation in the terahertz range**
M. Runge, A. Ghalgaoui, I. Gonzalez-Vallejo, F. Thiemann, M. Horn-von Hoegen, K. Reimann, M. Woerner, and T. Elsaesser
Phys. Rev. B **107**, 245140 (2023, Editor's suggestion)
547. **Transient terahertz Stark effect: A dynamic probe of electric interactions in polar liquids**
P. Singh, J. Zhang, D. Engel, B. P. Fingerhut, and T. Elsaesser
J. Phys. Chem. Lett. **14**, 5505 (2023)
546. **Excitation transfer from Cr²⁺ to Fe²⁺ ions in co-doped ZnSe as a pumping scheme for infrared solid-state lasers**
J. W. Tomm, G. Steinmeyer, P. Fuertjes, U. Griebner, and T. Elsaesser
J. Electron. Mat. **52**, 5166 (2023)
545. **Quantum pathways of carrier and coherent phonon excitation in bismuth**
A. Koc, I. Gonzales-Vallejo, M. Runge, A. Ghalgaoui, K. Reimann, L. Kremeyer, F. Thiemann, M. Horn-von Hoegen, K. Sokolowski-Tinten, M. Woerner, and T. Elsaesser
Phys. Rev. B **107**, L180303 (2023, Editor's Suggestion)
544. **Efficient electronic excitation transfer via phonon-assisted dipole-dipole coupling in Fe²⁺:Cr²⁺:ZnSe**
G. Steinmeyer, J. W. Tomm, P. Fuertjes, U. Griebner, S. S. Balabanov, and T. Elsaesser
Phys. Rev. Appl. **19**, 054043 (2023)
543. **Special issue on time-resolved vibrational spectroscopy**
K. J. Kubarych, M. C. Thielges, T. Tahara, and T. Elsaesser
J. Chem. Phys. **158**, 160401 (2023)
542. **Few-cycle 65- μ J pulses at 11.4 μ m for ultrafast nonlinear longwave-infrared spectroscopy**
P. Fuertjes, M. Bock, L. von Grafenstein, D. Ueberschaer, U. Griebner, and T. Elsaesser
Optica **9**, 1303 (2022)
541. **Short-range cooperative slow-down of water solvation dynamics around SO₄²⁻-Mg²⁺ ion pairs**
A. Kundu, S. I. Mamatkulov, F. N. Brünig, D. J. Bonthuis, R. R. Netz, T. Elsaesser, and B. P. Fingerhut
ACS Phys. Chem. Au **2**, 506 (2022, ACS Editors' Choice)

540. **Short-range slowdown of water solvation dynamics around SO_4^{2-} - Mg^{2+} ion pairs** A. Kundu, S. I. Mamatkulov, F. N. Brnig, D. J. Bonthuis, R. R. Netz, T. Elsaesser, and B. P. Fingerhut
in: *Ultrafast Phenomena 2022*, Optica Publishing Group, F2A.2 (2022)
539. **Underdamped longitudinal soft mode dynamics in KDP observed by ultrafast x-ray diffraction**
I. Gonzalez-Vallejo, A. Koc, K. Reimann, M. Woerner, and T. Elsaesser
in: *Ultrafast Phenomena 2022*, Optica Publishing Group Th4A.34 (2022)
538. **Phonon-induced valence-charge relocation in cubic BN observed by ultrafast x-ray diffraction**
M. Woerner, S. Priyadarshi, I. Gonzalez-Vallejo, C. Hauf, K. Reimann, and T. Elsaesser
in: *Ultrafast Phenomena 2022*, Optica Publishing Group, Th2B.4 (2022)
537. **Intersubband shift currents in asymmetric quantum wells as a source of mono-cycle terahertz pulses**
M. Runge, T. Kang, K. Biermann, K. Reimann, M. Woerner, T. Elsaesser
in: *Ultrafast Phenomena 2022*, Optica Publishing Group, Tu5A.3 (2022)
536. **Coherent underdamped polarons in liquid alcohols**
P. Singh, J. Zhang, A. Ghalgaoui, K. Reimann, B. P. Fingerhut, M. Woerner, and T. Elsaesser
in: *Ultrafast Phenomena 2022*, Optica Publishing Group, W4A.30 (2022)
535. **Coherent polaron dynamics of electrons solvated in polar liquids**
P. Singh, J. Zhang, A. Ghalgaoui, K. Reimann, B. P. Fingerhut, M. Woerner, and T. Elsaesser
PNAS Nexus **1**, pgac078 (2022)
534. **Ultrafast vibrational response of activated C-D bonds in a chloroform-platinum(II) complex**
J. Zhang, A. Kundu, T. Elsaesser, P. Macchi, M. Kalter, G. Eickerling, and W. Scherer
J. Phys. Chem. Lett. **13**, 4447-4454 (2022)
533. **Kinetics of excitation transfer from Cr^{2+} to Fe^{2+} ions in co-doped ZnSe**
P. Fürtjes, J. W. Tomm, U. Griebner, G. Steinmeyer, S. A. Balabanov, E. M. Gavrishchuk, and T. Elsaesser
Opt. Lett. **47**, 2129 (2022)
532. **Phonon-induced relocation of valence charge in boron nitride observed by ultrafast x-ray diffraction**
S. Priyadarshi, I. González Vallejo, C. Hauf, K. Reimann, M. Woerner, and T. Elsaesser
Phys. Rev. Lett. **128**, 136402 (2022)
531. **Field-induced electron generation in water: Solvation dynamics and many-body interactions**
M. Woerner, B. P. Fingerhut, and T. Elsaesser
J. Phys. Chem. B **126**, 2621 (2022, perspective article)

530. **Underdamped longitudinal soft modes in ionic crystallites - lattice and charge motions observed by ultrafast x-ray diffraction**
I. González-Vallejo, A. Koç, K. Reimann, M. Woerner, and T. Elsaesser
Struct. Dyn. **9**, 024501 (2022)
529. **Cr:ZnS-based soliton self-frequency shifted signal generation for a tunable sub-100 fs MWIR OPCPA**
P. Fuertjes, L. von Grafenstein, C. Mei, M. Bock, U. Griebner, and T. Elsaesser
Opt. Express **30**, 5142 (2022)
528. **Mono-cycle terahertz pulses from intersubband shift currents in asymmetric semiconductor quantum wells**
M. Runge, T. Kang, K. Biermann, K. Reimann, M. Woerner, and T. Elsaesser
Optica **8**, 1638 (2021)
527. **Contact pairs of RNA with magnesium ions - electrostatics beyond the Poisson-Boltzmann equation**
B. P. Fingerhut, J. Schauss, A. Kundu, and T. Elsaesser
Biophys. J. **120**, 5322 (2021)
526. **Ultrafast nonlinear phonon response of few-layer hexagonal boron nitride**
T. Kang, J. Zhang, A. Kundu, K. Reimann, M. Woerner, T. Elsaesser, B. Gil, G. Cassabois, C. Flytzanis, G. Fugallo, M. Lazzeri, R. Page, and D. Jena
Phys. Rev. B **104**, L140302 (2021, Editor's suggestion)
525. **Phosphate vibrations probe electric fields in hydrated biomolecules: spectroscopy, dynamics and interactions**
T. Elsaesser, J. Schauss, A. Kundu, and B. P. Fingerhut
J Phys. Chem. B **125**, 3899 (2021) (Tanimura Festschrift)
524. **Two-color two-dimensional terahertz spectroscopy: A new approach for exploring even-order nonlinearities in the nonperturbative regime**
M. Woerner, A. Ghalgaoui, K. Reimann, and T. Elsaesser
J. Chem. Phys. **154**, 154203 (2021)
523. **Perspective: Two-dimensional terahertz spectroscopy of condensed-phase molecular systems**
K. Reimann, M. Woerner, and T. Elsaesser
J. Chem. Phys. **154**, 120901 (2021)
522. **Compact OPCPA system seeded by a Cr:ZnS laser for generating tunable femtosecond pulses in the MWIR**
P. Fuertjes, L. von Grafenstein, D. Ueberschaer, C. Mei, U. Griebner, and T. Elsaesser
Opt. Lett. **46**, 1704 (2021)
521. **Terahertz polaron oscillations of electrons solvated in liquid water**
A. Ghalgaoui, B. P. Fingerhut, K. Reimann, T. Elsaesser, and M. Woerner
Phys. Rev. Lett. **126**, 097401 (2021, Editor's suggestion)
520. **Magnesium contact ions stabilize the tertiary structure of transfer RNA: Electrostatics mapped by two-dimensional infrared spectra and theoretical simulations**
J. Schauss, A. Kundu, B. P. Fingerhut, and T. Elsaesser
J. Phys. Chem. B **125**, 740 (2021)

519. **Compact high-flux hard x-ray source driven by femtosecond mid-infrared pulses at a 1 kHz repetition rate**
A. Koç, C. Hauf, M. Woerner, L. von Grafenstein, D. Ueberschaer, M. Bock, U. Griebner, and T. Elsaesser
Opt. Lett. **46**, 210 (2021)
518. **Impact of RNA melting on hydrating water structure mapped by femtosecond 2D-IR spectroscopy**
B. P. Fingerhut, A. Kundu, J. Schauss, and T. Elsaesser
in: *The 22nd International Conference on Ultrafast Phenomena 2020*, OSA Publishing (2020), doi.org/10.1364/UP.2020.M2A.1
517. **Structural discrimination of phosphate contact ion pairs in water by femtosecond 2D-IR spectroscopy**
A. Kundu, J. Schauss, B. P. Fingerhut, and T. Elsaesser
in: *The 22nd International Conference on Ultrafast Phenomena 2020*, OSA Publishing (2020), doi.org/10.1364/UP.2020.M4B.9
516. **Nonlinear terahertz response of solvated electrons in liquid water**
A. Ghalgaoui, B. P. Fingerhut, K. Reimann, M. Woerner, and T. Elsaesser
in: *The 22nd International Conference on Ultrafast Phenomena 2020*, OSA Publishing (2020), doi.org/10.1364/UP.2020.Th4A.4
515. **Blue-shift of the TO phonon resonance in GaAs by femtosecond electron-hole excitation**
K. Reimann, A. Ghalgaoui, M. Woerner, T. Elsaesser, C. Flytzanis, and K. Biermann
in: *The 22nd International Conference on Ultrafast Phenomena 2020*, OSA Publishing (2020), doi.org/10.1364/UP.2020.Tu3B.3
514. **Multi-millijoule, few cycle 5 μm OPCPA at 1 kHz repetition rate**
L. von Grafenstein, M. Bock, D. Ueberschaer, E. Escoto, A. Koç, P. Schuenemann, U. Griebner, and T. Elsaesser
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513. **Field-induced tunneling ionization and terahertz-driven electron dynamics in liquid water**
A. Ghalgaoui, L.-M. Koll, B. Schütte, B. P. Fingerhut, K. Reimann, M. Woerner, and T. Elsaesser
J. Phys. Chem. Lett. **11**, 7717 (2020)
512. **Frequency upshift of the transverse optical phonon resonance in GaAs by femtosecond electron-hole excitation**
A. Ghalgaoui, K. Reimann, M. Woerner, T. Elsaesser, C. Flytzanis, and K. Biermann
Phys. Rev. Lett. **125**, 027401 (2020)
511. **Spatial distribution of electric-field enhancement across the gap of terahertz bow-tie antennas**
M. Runge, D. Engel, M. Schneider, K. Reimann, M. Woerner, and T. Elsaesser
Opt. Express **28**, 399462 (2020)

510. **Aqueous contact ion pairs of phosphate groups with Na⁺, Ca²⁺ and Mg²⁺: Structural discrimination by femtosecond infrared spectroscopy and molecular dynamics simulations**
B. P. Fingerhut, J. Schauss, A. Kundu, and T. Elsaesser
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509. **2.05 μm chirped pulse amplification system at a 1 kHz repetition rate - 2.4 ps pulses with 17 GW peak power**
L. von Grafenstein, M. Bock, D. Ueberschaer, Azize Koç, U. Griebner, T. Elsaesser
Opt. Lett. **45**, 3836 (2020)
508. **Change of hydration patterns upon RNA melting probed by excitations of phosphate backbone vibrations**
A. Kundu, J. Schauss, B. P. Fingerhut, and T. Elsaesser
J. Phys. Chem. B **124**, 2132 (2020)
507. **Contact ion pairs of phosphate groups in water: Two-dimensional infrared spectroscopy of dimethyl phosphate and ab initio simulations**
J. Schauss, A. Kundu, B. P. Fingerhut, and T. Elsaesser
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506. **Impact of piezoelectric fields on coherent zone-folded phonons in GaAs/AlAs superlattices**
F. Mahler, K. Reimann, M. Woerner, T. Elsaesser, C. Flytzanis, and K. Biermann
Phys. Rev. B **100**, 121302(R) (2019)
505. **Noncovalent interactions of hydrated DNA and RNA mapped by 2D-IR spectroscopy**
B. P. Fingerhut and T. Elsaesser
in: *Coherent Multidimensional Spectroscopy*, M. Cho (Ed.), Springer, Singapore 2019, p. 171
504. **Hydrated excess protons in acetonitrile/water mixtures: solvation species and ultrafast proton motions**
A. Kundu, F. Dahms, B. P. Fingerhut, E. T. J. Nibbering, E. Pines, and T. Elsaesser
J. Phys. Chem. Lett. **10**, 2287 (2019)
503. **Time-resolved photoluminescence from n-doped GaN/Al_{0.18}Ga_{0.82}N short-period superlattices probes carrier kinetics and long-term structural stability**
F. Mahler, J. W. Tomm, K. Reimann, M. Woerner, V. Hoffmann, C. Netzel, M. Weyers, and T. Elsaesser
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502. **Soft-mode driven dynamics in ferroelectrics - new insight from ultrafast terahertz and x-ray experiments**
T. Elsaesser, G. Folpini, C. Somma, K. Reimann, M. Holtz, A. A. Hernandez Salvador, and M. Woerner
Ultrafast Phenomena XXI 205 EPJ Web of Conferences (2019) 04001/1-3 (invited paper)

501. **Interactions of RNA and water probed by 2D-IR spectroscopy**
B. P. Fingerhut, E. M. Bruening, J. Schauss, T. Siebert, and T. Elsaesser
Ultrafast Phenomena XXI 205 EPJ web of Conferences (2019) 05007/1-3
500. **Ultrafast dynamics of hydrated excess protons in CH₃CN:H₂O mixtures**
F. Dahms, A. Kundu, E. Pines, B. P. Fingerhut, E. T. J. Nibbering, and T. Elsaesser
Ultrafast Phenomena XXI 205 EPJ Web of Conferences (2019) 09003/1-3
499. **Terahertz driven amplification of coherent optical phonons in GaAs coupled to metallic dog-bone resonators**
M. Woerner, C. Somma, K. Reimann, T. Elsaesser, I. Brener, J. L. Reno, Y. Yang, and P. Q. Liu
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498. **Spectral meta-moments reveal hidden signatures of vortex pulses**
M. Liebmann, A. Treffer, M. Bock, T. Seiler, J. Jahns, T. Elsaesser, and R. Grunwald
Ultrafast Phenomena XXI 205 EPJ Web of Conferences (2019) 01005/1-3
497. **Millijoule few-cycle 5 μm source at 1 kHz repetition rate for generating broadband pulses from the mid- to far-infrared**
G. Folpini, K. Reimann, M. Woerner, L. von Grafenstein, M. Bock, U. Griebner, and T. Elsaesser
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496. **Terahertz driven amplification of coherent optical phonons in GaAs coupled to a metasurface**
M. Woerner, C. Somma, K. Reimann, T. Elsaesser, P. Q. Liu, Y. Yang, J. L. Reno, and I. Brener
Phys. Rev. Lett. **122**, 107402 (2019)
495. **Recent advances in ultrafast x-ray sources**
R. Schoenlein, T. Elsaesser, K. Holldack, Z. Huang, H. Kapteyn, M. Murnane, and M. Woerner
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494. **Concepts and Applications of Nonlinear Terahertz Spectroscopy**
T. Elsaesser, K. Reimann, and M. Woerner, IOP Concise Physics, Morgan & Claypool, San Rafael (2019)
493. **Self-imaging of tailored vortex pulse arrays and spectral Gouy rotation echoes**
M. Liebmann, A. Treffer, M. Bock, T. Seiler, J. Jahns, T. Elsaesser, and R. Grunwald
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492. **Phonon driven charge dynamics in polycrystalline acetylsalicylic acid mapped by ultrafast x-ray diffraction**
C. Hauf, A. Hernandez Salvador, M. Holtz, M. Woerner, and T. Elsaesser
Struct. Dyn. **6**, 014503 (2019, Feature Article)
491. **Book review: Structures on different time scales. T. Woike, D. Schaniel (Eds.). De Gruyter, 2018**
T. Elsaesser
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490. **Phosphate–magnesium ion interactions in water probed by ultrafast two-dimensional infrared spectroscopy**
J. Schauss, F. Dahms, B. F. Fingerhut, and T. Elsaesser
J. Phys. Chem. Lett. **10**, 238 (2019)
489. **Soft x-ray absorption spectroscopy of aqueous solutions using a table top femtosecond soft x-ray source**
C. Kleine, M. Ekimova, G. Goldsztejn, S. Raabe, C. Strüber, J. Ludwig, S. Yarlagadda, S. Eisebitt, M. J. J. Vrakking, T. Elsaesser, E. T. J. Nibbering, and A. Rouzée
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488. **Resonant second-order nonlinear terahertz response of gallium arsenide**
A. Ghalgaoui, K. Reimann, M. Woerner, and T. Elsaesser
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487. **Ultrafast vibrational relaxation and energy dissipation of hydrated excess protons in polar solvents**
A. Kundu, F. Dahms, B. P. Fingerhut, E. T. J. Nibbering, E. Pines, and T. Elsaesser
Chem. Phys. Lett. **713**, 111 (2018)
486. **Generation of millijoule few-cycle pulses at 5 μm by indirect spectral shaping of the idler in an optical parametric chirped pulse amplifier**
M. Bock, L. von Grafenstein, U. Griebner, and T. Elsaesser
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485. **Macroscopic electric polarization and microscopic electron dynamics: quantitative insight from femtosecond x-ray diffraction**
C. Hauf, M. Woerner, and T. Elsaesser
Phys. Rev. B **98**, 054306 (2018, Editor's Suggestion)
484. **Ultrafast carrier dynamics in a GaN/Al_{0.18}Ga_{0.82}N superlattice**
F. Mahler, J. W. Tomm, K. Reimann, M. Woerner, T. Elsaesser, C. Flytzanis, V. Hoffmann, and M. Weyers
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483. **Soft-mode driven polarity reversal in ferroelectrics mapped by ultrafast x-ray diffraction**
C. Hauf, A.-A. Hernandez Salvador, M. Holtz, M. Woerner, and T. Elsaesser
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482. **Multidimensional terahertz spectroscopy**
M. Woerner, K. Reimann, and T. Elsaesser
in: *Encyclopedia of Modern Optics*, 2nd ed., R. D. Guenther, D. G. Steel (Eds.), vol. 2, pp. 197-206 (2018)
481. **Vibrational dynamics and couplings of the hydrated RNA backbone - a two-dimensional infrared study**
E. M. Bruening, J. Schauss, T. Siebert, B. F. Fingerhut, and T. Elsaesser
J. Phys. Chem. Lett. **9**, 583 (2018)
480. **Spectral anomalies and Gouy rotation around the singularity of ultra-short vortex pulses**
M. Liebmann, A. Treffer, M. Bock, T. Elsaesser, and R. Grunwald
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479. **Editorial: Im Atomkino**
T. Elsaesser
Physik in unserer Zeit **48**, 263 (2017)
478. **5 μm , few-cycle pulses with multi-gigawatt peak power at a 1 kHz repetition rate**
L. von Grafenstein, M. Bock, D. Ueberschaer, K. Zawilski, P. Schunemann, U. Griebner, and T. Elsaesser
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477. **Water librations in the hydration shells of phospholipids**
G. Folpini, T. Siebert, M. Woerner, S. Abel, D. Laage, and T. Elsaesser
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476. **Strong local-field enhancement of the nonlinear soft-mode response in a molecular crystal**
G. Folpini, K. Reimann, M. Woerner, T. Elsaesser, J. Hoja, and A. Tkatchenko
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475. **Water dynamics in the hydration shells of biomolecules**
D. Laage, T. Elsaesser, and J. T. Hynes
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474. **Introduction: Ultrafast processes in chemistry**
T. Elsaesser
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473. **Large-amplitude motion of hydrated excess protons mapped by ultrafast 2D IR spectroscopy**
F. Dahms, B. P. Fingerhut, E. T. J. Nibbering, E. Pines, and T. Elsaesser
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472. **Towards shot-noise limited diffraction experiments with table-top femtosecond hard x-ray sources**
M. Holtz, C. Hauf, J. Weisshaupt, A. A. Hernandez Salvador, M. Woerner, and T. Elsaesser
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471. **Molecular couplings and energy exchange between DNA and water mapped by femtosecond infrared spectroscopy of backbone vibrations**
Y. Liu, B. Guchhait, T. Siebert, B. P. Fingerhut, and T. Elsaesser
Struct. Dyn. **4**, 044015 (2017)
470. **Perspective: Structure and ultrafast dynamics of biomolecular hydration shells**
D. Laage, T. Elsaesser, and J. T. Hynes
Struct. Dyn. **4**, 044018 (2017)
469. **Ultrafast modulation of electronic structure by coherent phonon excitations**
J. Weisshaupt, A. Rouzée, M. Woerner, M. J. J. Vrakking, T. Elsaesser, E. L. Shirley, and A. Borgschulte
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468. **Nonlinear terahertz spectroscopy on multilayer graphene**
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467. **Ho:YLF chirped pulse amplification at kilohertz repetition rates - 4.3 ps pulses at 2 μm with GW peak power**
L. von Grafenstein, M. Bock, D. Ueberschaer, U. Griebner, and T. Elsaesser
Opt. Lett. **41**, 4668 (2016)
466. **Predominance of short range Coulomb forces in phosphate-water interactions - a theoretical analysis**
B. P. Fingerhut, R. Costard, and T. Elsaesser
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464. **Range, magnitude and ultrafast dynamics of electric fields at the hydrated DNA surface**
T. Siebert, B. Guchhait, Y. Liu, B. P. Fingerhut, and T. Elsaesser
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463. **The hydrated excess proton in the Zundel cation H_5O_2^+ : the role of ultrafast solvent fluctuations**
F. Dahms, R. Costard, E. Pines, E. T. J. Nibbering, B. P. Fingerhut, and T. Elsaesser
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462. **Phase-resolved two-dimensional terahertz spectroscopy including off-resonant interactions beyond the $\chi^{(3)}$ limit**
C. Somma, G. Folpini, K. Reimann, M. Woerner, and T. Elsaesser
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461. **Shortwave infrared (SWIR) emission from 450 nm InGaN diode lasers**
R. Kernke, M. Hempel, J. W. Tomm, T. Elsaesser, B. Stojetz, H. König, and U. Strauß
Opt. Mat. Express **6**, 2139 (2016)
460. **Two-phonon quantum coherences in indium antimonide studied by nonlinear two-dimensional terahertz spectroscopy**
C. Somma, G. Folpini, K. Reimann, M. Woerner, and T. Elsaesser
Phys. Rev. Lett. **116**, 177401 (2016)
459. **Ultrafast vibrational energy flow in water monomers in acetonitrile**
F. Dahms, R. Costard, E. T. J. Nibbering, and T. Elsaesser
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458. **Strong amplification of coherent acoustic phonons by intraminiband currents in a semiconductor superlattice**
K. Shinokita, K. Reimann, M. Woerner, T. Elsaesser, R. Hey, and C. Flytzanis
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M. Hempel, J. W. Tomm, A. Bachmann, C. Lauer, M. Furitsch, U. Strauß, and T. Elsaesser
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L. von Grafenstein, M. Bock, G. Steinmeyer, U. Griebner, and T. Elsaesser
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B. Guchhait, Y. Liu, T. Siebert, and T. Elsaesser
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454. **Long-term aging and quick stress-testing of 980-nm single-spatial mode lasers**
M. Hempel, J. W. Tomm, D. Venables, V. Rossin, E. Zucker, and T. Elsaesser
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T. Tyborski, S. Kalusniak, S. Sadofev, F. Henneberger, M. Woerner, and T. Elsaesser
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T. Siebert, B. Guchhait, Y. Liu, R. Costard, and T. Elsaesser
J. Phys. Chem. B **119**, 9670 (2015)
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