List of Publications

2024

(65) L. Wenthaus, N. M. Kabachnik, M. Borgwardt, S. Palutke, D. Kutnyakhov, F. Pressacco, M. Scholz, D. Potorochin, N. Wind, S. Dsterer, G. Brenner, O. Gessner, S. Molodtsov, W. Eberhardt & F. Roth "New insights into the laser-assisted photoelectric effect from solid-state surfaces" *submitted*, arXiv:2309.00099v2 (2024)

(64) K. Baumgärtner, M. Nozaki, C. Metzger, N. Wind, M. Haniuda, M. Heber, D. Kutnyakhov, F. Pressaco, L. Wenthaus, F. Roth, C.H. Min, F. Reinert, A. Madsen, S. Mahatha, K. Niki, K. Rossnagel & M. Scholz "The complete molecular movie: Capturing electronic and structural dyanamics at the molecular-2D materials interface" *submitted*, (2024)

(63) F. Roth, J. Mahl, M. Borgwardt, L. Wenthaus, F. Brausse, V. Garbe, O. Gessner & W. Eberhardt "Dynamical nonlinear inversion of the surface photovoltage at Si(100)" *accepted for publication in Phys. Rev. Lett.*, (2024)

2022

(62) M. Knupfer, F. Jerzembeck, N. Kikugawe, F. Roth & J. Fink "Propagating charge carrier plasmon in $Sr_2Ru_2O_4$" *Phys. Rev. B*, **106**, L241103 (2022)

(61) D. Potorochin, R. Kurleto, O. Clark, E. D. L. Rienks, J. Sánchez-Barriga, F. Roth, V. Voroshnin, A. Federov, W. Eberhardt, B. Büchner & J. Fink "Lifetime of quasi-particles in the nearly-free electron metal Sodium" *Phys. Rev. B*, **106**, 125138 (2022)

(60) M. Heber, N. Wind, D. Kutnyakhov, F. Pressacco, T. Arion, F. Roth, W. Eberhardt & K. Rossnagel "Multispectral time-resolved energy-momentum microscopy using high-harmonic extreme ultraviolet radiation"*Rev. Sci. Instrum.*, **93**, 083905 (2022)

(59) L. Graf, F. Lui, M. Naumann, F. Roth, B. Debnath, B. Büchner, Y. Krupskaya, A. Popov & M. Knupfer "Optical anisotropy and momentum dependent excitons in Dibenzopentacene single crystals"*ACS Omega*, **7**, 21183 (2022)

(58) K. Baumgärtner, M. Reuner, C. Metzger, D. Kutnyakhov, M. Heber, F. Pressacco, C. H. Min, T. R. F. Peixoto, M. Reis, C. Kim, W. Lu, R. Shayduk, W. M. Izquierdo, G. Brenner, F. Roth, A. Schll, S. Molodtsov, W. Wurth, F. Reinert, A. Madsen, D. Popova-Gorelova & M. Scholz "Ultrafast molecular orbital tomography of a pentacene thin film using time-resolved momentum microscopy at a free-electron laser"*Nat. Commun.*, **13**, 2741 (2022)

(57) M. K. Rabchinskii, S. A. Ryzhkov, N. A. Besedina, M. Brzhezinskaya, M. N. Malkov, D. Yu. Stolyarova, A. F. Arutyunyan, N. S. Struchkov, S. D. Saveliev, I. D. Diankin, D. A. Kirilenko, S. I. Pavlov, D. V. Potorochin, F. Roth, M. V. Gudkov, A. A. Gulin, P. Cai, Z. Liu, A. V. Golovin, &P. l. N. Brunkov "Guiding graphene derivatization for covalent immobilization of aptamers" *Carbon*, **196**, 264 (2022)

2021

(56) S. Neppl, J. Mahl, F. Roth, G. Mercurio, G. Zeng, F. Toma, N. Huse, P. Feulner & O. Gessner "Nanoscale confinement of photo-injected electrons at hybrid interfaces"*J. Phys. Chem. Lett.*, **12**, 11951 (2021)

(55) F. Brausse, M. Borgwardt, J. Mahl, M. Fraund, F. Roth, M. Blum, W. Eberhardt & O. Gessner "Real-time interfacial electron dynamics revealed through temporal correlations in X-ray photoelectron spectroscopy"*Struct. Dyn.*, **8**, 044301 (2021)

(54) D. Tsurkan, P. Simon, C. Schimpf, M. Motylenko, D. Rafaja, F. Roth, D. S. Inosov, A. A. Makarova, I. Stepniak, I. Petrenko, A. Springer, E. Langer, A. A. Kulbakov, M. Avdeev, A. R. Stefankiewicz, K. Heimler, O. Kononchuk, S. Hippmann, D. Kaiser, C. Viehweger, A. Rogoll, A. Voronkina, V. Kovalchuk, V. V. Bazhenov, R. Galli, M. Rahimi-Nasrabadi, S. L. Molodtsov, Y. Joseph, C. Vogt, D. V. Vyalikh, M. Bertrau & H. Ehrlich "Extreme Biomimetics: Designing of the first nanostructured 3D spongin-atacamite composite and its application"*Adv. Mater.*, 2101682 (2021)

(53) F. Roth, M. Borgwardt, L. Wenthaus, J. Mahl, S. Palutke, G. Brenner, G. Mercurio, S. Molodtsov, W. Wurth, O. Gessner & W. Eberhardt "Direct observation of charge separation in an organic light harvesting system by femtosecond time-resolved X-ray photoelectron spectroscopy"*Nat. Commun.*, **12**, 1196 (2021)

2020

(52) M. Borgwardt, J. Mahl, F. Roth, L. Wenthaus, F. Brausse, M. Blum, K. Schwarzburg, G. Liu, F.M. Toma & O. Gessner "Photoinduced charge carrier dynamics and electron injection efficiencies in Au nanoparticle-sensitized TiO_2 determined with picosecond time-resolved X-ray photoelectron spectroscopy"*J. Phys. Chem. Lett.*, **11**, 5476 (2020)

(51) F. Roth, A. Revcolevschi, B. Büchner, M. Knupfer & J. Fink "Evidence for an orbital dependent Mott transition in the ladders of $(La,Ca)_xSr_{14-x}Cu_{24}O_{41}$ derived by electron energy-loss spectroscopy"*Phys. Rev. B*, **101**, 195132 (2020)

(50) M.K. Rabchinskii, S.A. Ryzhkov, D.A. Kirilenko, N.V. Ulin, M.V. Baidakova, V.V. Shnitov, S.I. Pavlov, R.G. Chumakov, D.Y. Stolyarova, N.A. Besedina, A.V. Shvidchenko, D.V. Potorochin, F. Roth, D.A. Smirnov, M.V. Gudkov, M. Brzhezinskaya, O.I. Lebedev, V.P. Melnikov & P.N. Brunkov "From graphene oxide towards aminated graphene: facile synthesis, its structure and electronic properties"*Sci. Rep.*, **10**, 6902 (2020)

2019

(49) I. Petrenko, A.P. Summers, P. Simon, S. Zoltowska-Aksamitowska, M. Motylenko, C. Schrimpf, D. Rafaja, F. Roth, K. Kummer, E. Brendler, O. Pokrovsky, R. Galli, M. Wysokowski, H. Meissner, E. Niederschlag, Y. Joseph, S. Molodtsov, A. Ereskovsky, V. Sikov, S. Nekipelov, O. Petrova, O. Volkova, M. Bertau, M. Kraft, A. Rogalev, M. Kopani, T. Jesioniowski & H. Ehrlich "Extreme Biomimetics: Preservation of molecular detail in centimeter-scale samples of biological meshes laid down by sponges"*Sci. Adv.*, **5**, eaax2805 (2019)

(48) S. Flipo, M. Kohout, F. Roth, T. Weigel, W. Schnelle, M. Bobnar, A. Ormeci, U. Burkhardt, C. Hennig, T. Leisegang, D.-C. Meyer, A. Leithe-Jasper & R. Gumeniuk "$CeMo_2B_5$: a new type of arrangement of puckered boron hexagonal rings"*Eur. J. Inorg. Chem.*, **2019**, 3572 (2019)

(47) J. Mahl, S. Neppl, F. Roth, M Borgwardt, C. Saladrigas, B. Toulson, T. Rahman, H. Bluhm, J. Guo, W. Yang, N. Huse, W. Eberhardt & O. Gessner "Decomposing electronic and lattice contributions in optical pump-X-ray probe transient inner-shell absorption spectroscopy of CuO"*Faraday Discuss.*, **216**, 414 (2019)

(46) F. Roth, S. Neppl, A. Shavorskiy, T. Arion, J. Mahl, H. O. Seo, , H. Bluhm, Z. Hussain, O. Gessner & W. Eberhardt "Efficient Charge Generation from Triplet Excitons in Metal-Organic Heterojunctions"*Phys. Rev. B.*, **99**, 020303(R) (2019)

2018

(45) T. Arion, W. Eberhardt, J. Feikes, A. Gottwald, P. Goslawski, A. Hoehl, H. Kaser, M. Kolbe, J. Li, C. Lupulescu, M. Richter, M. Ries, F. Roth, M. Ruprecht, T. Tydecks & G. Wüstefeld "Transverse resonance island buckets for synchrotron-radiation based electron time-of-flight spectroscopy"*Rev. Sci. Instr.*, **89**, 103114 (2018)

(44) M. K. Rabchinskii, A. T. Dideikin, D. A. Kirilenko, M. V. Baidakova, V. V. Shnitov, F. Roth, S. V. Konyakhin, N. A. Besedina, S. I. Pavlov, R. A. Kuricyn, N. M. Lebedeva, P. N. Brunkov & A. Ya. Vul "Facile reduction of graphene oxide suspensions and films using glass wafers"'*Sci. Rep.*, **8**, 14154 (2018)

(43) T. Szatkowski, K. Kopczyński, M. Motylenko, H. Borrmann, B. Mania, M. Graś, G. Lota, V. V. Bazhenov, D. Rafaja, F. Roth, J. Weise, E. Langer, M. Wysokowski, S. Żółtkowska-Aksamitowska, S.L. Molodtsov, J. Hubálková, C. G. Aneziris, Y. Joseph, H. Ehrlich & T. Jesionowski "Extreme Biomimetics: Carbonized 3D spongin scaffold as a support for nanostructured manganese(IV) oxide and its electrochemical applications"*Nano Res.*, **11**, 4199 (2018)

(42) F. Roth, T. Arion, H. Kaser, A. Gottwald & W. Eberhardt "Angle resolved Photoemission from Ag and Au single crystals: Final state lifetimes in the attosecond range"*J. Electron. Spectrosc. Relat. Phenom.*, **224**, 84 (2018)

(41) K. Witte, I. Mantouvalou, R. Sánchez-de-Armas, H. Lokstein, J. Lebendig-Kuhla, A. Jonas, F. Roth, B. Kanngießer & H. Stiel "On the Electronic Structure of Cu-Chlorophyllin and its Breakdown Products—a Carbon K-edge X-ray Absorption Spectroscopy Study"*J. Phys. Chem. B*, **122**, 1846 (2018)

2017

(40) S. Halilov, E. Gorelov, M. Izquierdo, A. Yaroslavtsev, V. Aristov, P. Moras, P. M. Sheverdyaeva, S. Kr. Mahatha, F. Roth, A. Lichtenstein & S. L. Molodtsov "Surface, final state, and spin effects in the valence-band photoemission spectra of $LaCoO_3$ (001)"*Phys. Rev B*, **96**, 205144 (2017)

2016

(39) E. Darlatt, B. Muhsin, R. Rösch, C. Lupulescu, F. Roth, M. Kolbe, A. Gottwald, H. Hoppe & M. Richter "Irradiation-induced degradation of PTB7 investigated by valence band and S $2p$ photoelectron spectroscopy", Contribution to the Focus Collection: Focus on Organic Photovoltaics *Nanotechnology*, **27**, 324005 (2016)

(38) F. Roth, C. Lupulescu, E. Darlatt, A. Gottwald & W. Eberhardt "Angle resolved Photoemission from Cu single crystals: Known facts and a few surprises about the photoemission process", Contribution to the Special Issue: Electronic structure and function from state-of-the-art spectroscopy and theory *J. Electron. Spectrosc. Relat. Phenom.*, **208**, 2 (2016)

(37) H. O. Seo, T. Arion, F. Roth, D. Ramm, C. Lupulescu & W. Eberhardt "Improving the efficiency of high harmonic generation (HHG) by Ne-admixing into a pure Ar gas medium"*Appl. Phys. B*, **122**, 70 (2016)

2015

(36) F. Roth & M. Knupfer "Low energy exciton pocket at finite momentum in tetracene"*Europhys. Lett.*, **112**, 37004 (2015)

(35) F. Roth, M. Herzig, C. Lupulescu, E. Darlatt, A. Gottwald, M. Knupfer & W. Eberhardt "Electronic properties of Mn-Phthalocyanine - C_{60} bulk heterojunctions: combining photoemission and electron energy-loss spectroscopy"*J. Appl. Phys.*, **118**, 185310 (2015)

(34) J. Fink, A. Charnukha, E. D. L. Rienks, Z. H. Liu, S. Thirupathaiah, I. Avigo, F. Roth, H. S. Jeevan, P. Gegenwart, M. Roslova, I. Morozov, S. Wurmehl, U. Bovensiepen, S. Borisenko, M. Vojta & B. Büchner "Non-Fermi-liquid scattering rates and anomalous band dispersion in ferropnictides"*Phys. Rev. B*, **92**, 201106(R) (2015)

(33) F. Roth & M. Knupfer "Impact of potassium doping on the electronic structure of tetracene and pentacene: an electron energy-loss study" *J. Chem. Phys.*, **143**, 154708 (2015)

(32) T. Arion, S. Neppl, F. Roth, A. Shavorskiy, O. Gessner, H. Bluhm, Z. Hussain & W. Eberhardt "Site-specific probing of charge transfer dynamics in organic photovoltaics"*Appl. Phys. Lett.*, **106**, 121602 (2015)

(31) F. Roth & M. Knupfer "Electronic excitation spectrum of doped organic thin films investigated using electron energy-loss spectroscopy", Contribution to the Special issue in honor of Prof. Nobuo Ueno: Progress in study of organic electronics by electron spectroscopies *J. Electron. Spectrosc. Relat. Phenom.*, **204**, 23 (2015)

2014

(30) E. D. L. Rienks, M. Ärrälä, M. Lindroos, F. Roth, W. Tabis, G. Yu, M. Greven & J. Fink "High-Energy Anomaly in the Angle-Resolved Photoemission Spectra of $Nd_{2-x}Ce_xCuO_4$: Evidence for a Matrix Element Effect" *Phys. Rev. Lett.*, **113**, 137001 (2014)

(29) F. Roth, A. König, J. Fink, B. Büchner & M. Knupfer "Electron Energy-Loss Spectroscopy: A versatile tool for the investigations of plasmonic excitations" *J. Electron. Spectrosc. Relat. Phenom.*, **195**, 85 (2014) — Review article

(28) U. Treske, M. S. Khoshkhoo, F. Roth, M. Knupfer, E. D. Bauer, J. L. Sarrao, B. Büchner & A. Koitzsch "X-ray Photoemission Study of CeTIn$_5$ (T = Co,Rh,Ir)" *J. Phys.: Condens. Matter*, **26**, 205601 (2014)

(27) F. Roth, C. Lupulescu, T. Arion, E. Darlatt, A. Gottwald & W. Eberhardt "Electronic properties and morphology of Cu-phthalocyanine - C_{60} composite mixtures" *J. Appl. Phys.*, **115**, 033705 (2014)

2013

(26) F. Roth, P. Cudazzo, B. Mahns, M. Gatti, J. Bauer, S. Hampel, M. Nohr, A. Schubert, H. Berger, M. Knupfer & A. Rubio "Loss spectroscopy of molecular solids: combining experiment and theory", Contribution to the Focus Issue "Focus on Novel Materials Discovery" *New J. Phys.*, **15**, 125024 (2013)

(25) F. Roth, E. Müller, B. Rellinghaus, B. Büchner & M. Knupfer "The electronic excitation spectrum of calcium doped picene: electron energy-loss spectroscopy study"*Phys. Rev. B*, **88**, 205105 (2013)

(24) E. D. L. Rienks, T. Wolf, K. Koepernik, I. Avigo, P. Hlawenka, C. Lupulescu, T. Arion, F. Roth, W. Eberhardt, U. Bovensiepen & J. Fink "Electronic structure and quantum criticality in $Ba(Fe_{1-x-y}Co_xMn_y)_2As_2$, an ARPES study" *Europhys. Lett.*, **103**, 47004 (2013)

(23) F. Roth, A. König, C. Kramberger, T. Pichler, B. Büchner & M. Knupfer "Challenging the nature of low-energy plasmon excitations in CaC_6 using electron energy-loss spectroscopy" *Europhys. Lett.*, **102**, 17001 (2013)

(22) F. Roth, B. Mahns, S. Hampel, M. Nohr. H. Berger, B. Büchner & M. Knupfer "Exciton properties of selected aromatic hydrocarbon systems", Contribution to the Topical Issue "Excitonic Processes in Condensed Matter, Nanostructured and Molecular Materials" *Eur. Phys. J. B*, **86**, 66 (2013)

(21) S. Lindner, B. Mahns, A. König, F. Roth, M. Knupfer, R. Friedrich, T. Hahn & J. Kortus "Phthalocyanine dimers in a blend: spectroscopic and theoretical studies of $MnPc^{\delta+}$/F16$CoPc^{\delta-}$"*J. Chem. Phys.*, **138**, 024707 (2013)

2012

(20) F. Roth, B. Mahns, R. Schönfelder, S. Hampel, M. Nohr, B. Büchner & M. Knupfer "Comprehensive studies of the electronic structure of pristine and potassium doped chrysene investigated by electron energy-loss spectroscopy"*J. Chem. Phys.*, **137**, 114508 (2012)

(19) B. Mahns, F. Roth, A. König, M. Grobosch, M. Knupfer & T. Hahn "Electronic properties of 1,2;8,9-dibenzopentacene thin films: a joint experimental and theoretical study"*Phys. Rev. B*, **85**, 035209 (2012)

(18) F. Roth, A. König, B. Mahns, B. Büchner & M. Knupfer "Evidence for phase formation in potassium intercalated 1,2;8,9-dibenzopentacene"*Eur. Phys. J. B*, **85**, 242 (2012)

(17) F. Roth, R. Schuster, A. König, M. Knupfer & H. Berger "Momentum dependence of excitons in pentacene"*J. Chem. Phys.*, **136**, 204708 (2012)

(16) B. Mahns, F. Roth & M. Knupfer "Absence of photoemission from the Fermi level in potassium intercalated picene and coronene films: structure, polaron or correlation physics?"*J. Chem. Phys.*, **136**, 134503 (2012)

(15) B. Mahns, F. Roth, M. Grobosch, S. Lindner, M. Knupfer, T. Saragi, T. Reichert, J. Salbeck, & T. Hahn "Electronic properties of spiro compounds for organic electronics"*J. Chem. Phys.*, **136**, 124702 (2012)

(14) C. Kramberger, F. Roth, R. Schuster, R. Kraus, M. Knupfer, E. Einarsson, S. Maruyama, D. J. Mowbray, A. Rubio, & T. Pichler "Channeling of charge carrier plasmons in carbon nanotubes"*Phys. Rev. B*, **85**, 085424 (2012)

(13) R. Friedrich, T. Hahn, J. Kortus, M. Fronk, F. Haidu, G. Salvan, D.R.T. Zahn, M. Schlesinger, M. Mehring, F. Roth, B. Mahns, & M. Knupfer "Electronic states and the influence of oxygen addition on the optical absorption behaviour of manganese phthalocyanine"*J. Chem. Phys.*, **136**, 064704 (2012)

(12) F. Roth, J. Bauer, B. Mahns, B. Büchner & M. Knupfer "Electronic structure of undoped and potassium doped coronene investigated by electron energy-loss spectroscopy"*Phys. Rev. B*, **85**, 014513 (2012)

2011

(11) P. Cudazzo, M. Gatti, F. Roth, B. Mahns, M. Knupfer & A. Rubio "Plasmon dispersion in molecular solids: Picene and potassium-doped picene"*Phys. Rev. B*, **84**, 155118 (2011)

(10) B. Mahns, F. Roth, M. Grobosch, D.R.T. Zahn & M. Knupfer "Electronic excitations of potassium intercalated manganese phthalocyanine investigated by electron energy-loss spectroscopy"*J. Chem. Phys.*, **134**, 194504 (2011)

(9) F. Roth, B. Mahns, B. Büchner & M. Knupfer "Exciton character in picene molecular solids"*Phys. Rev. B*, **83**, 165436 (2011)

(8) F. Roth, B. Mahns, B. Büchner & M. Knupfer "Dynamic response and electronic structure of potassium-doped picene investigated by electron energy-loss spectroscopy"*Phys. Rev. B*, **83**, 144501 (2011)

2010

(7) F. Roth, C. Hess, B. Büchner, U. Ammerahl, A. Revcolevschi & M. Knupfer "Plasmons and interband transitions of $Ca_{11}Sr_3Cu_{24}O_{41}$ investigated by electron energy-loss spectroscopy"*Phys. Rev. B*, **82**, 245110 (2010)

(6) S.-L. Drechsler, F. Roth, M. Grobosch, R. Schuster, K. Koepernik, H. Rosner, G. Behr, M. Rotter, D. Johrendt, B. Büchner & M. Knupfer "Insight into the physics of Fe-pnictides from optical and T = 0 penetration depth data"*Physica C: Superconductivity*, **470**, S332 (2010)

(5) F. Roth, M. Gatti, P. Cudazzo, M. Grobosch, B. Mahns, B. Büchner, A. Rubio & M. Knupfer "Electronic properties of molecular solids: the peculiar case of solid picene"*New J. Phys.*, **12**, 103036 (2010)

(4) F. Roth, A. König, R. Kraus, M. Grobosch, T. Kroll & M. Knupfer "Probing the molecular orbitals of FePc near the chemical potential using electron energy-loss spectroscopy"*Eur. Phys. J. B*, **74**, 339 (2010)

2009

(3) A. König, F. Roth, R. Kraus & M. Knupfer "Electronic properties of potassium doped FePc from electron energy-loss spectroscopy"*J. Chem. Phys.*, **130**, 214503 (2009)

(2) T. Kroll, F. Roth, A. Koitzsch, R. Kraus, D.R. Batchelor, J. Werner, G. Behr, B. Büchner & M. Knupfer "Absorption and photoemission spectroscopy of rare-earth oxypnictides"*New J. Phys.*, **11**, 025019 (2009)

2008

(1) F. Roth, A. König, R. Kraus & M. Knupfer "Potassium induced phase transition of FePc thin films"*J. Chem. Phys.*, **128**, 194711 (2008)