

Publication List, J. Zaanen.

1. J. Zaanen, G. A. Sawatzky and J. W. Allen, 'Band Gaps and Electronic Structure of Transition-Metal Compounds', Phys. Rev. Lett. **55**, 418 (1985).
2. J. Fink, Th. Mueller-Heinzerling, B. Scheerer, W. Speier, F. U. Hillebrecht, J. C. Fuggle, J. Zaanen and G. A. Sawatzky, '2p Absorption Spectra of the 3d Elements', Phys. Rev. B **32**, 4899 (1985).
3. J. Zaanen, G. A. Sawatzky, J. Fink, W. Speier and J. C. Fuggle, ' $L_{2,3}$ Absorption Spectra of the Lighter 3d Transition Metals', Phys. Rev. B **32**, 4905 (1985).
4. G. van der Laan, J. Zaanen, G. A. Sawatzky, R. Karnatak and J.-M. Esteva, 'Correlation Effects, Charge-transfer Energies and Covalency in Nickel Compounds as Determined by X-Ray Absorption Spectroscopy', Solid State Commun. **56**, 673 (1985).
5. G. van der Laan, J. Zaanen, G. A. Sawatzky, R. Karnatak and J.-M. Esteva, 'Comparison of X-ray Absorption with X-ray Photoemission of Nickel dihalides and NiO', Phys. Rev. B **33**, 4233 (1986).
6. J. Zaanen, G. A. Sawatzky and J. W. Allen, 'The Electronic Structure and Band Gaps in Transition Metal Compounds', J. Magn. Magn. Mat. **54-57**, 607 (1986).
7. J. Zaanen, C. Westra and G. A. Sawatzky, 'Determination of the Electronic Structure of Transition Metal Compounds: 2p X-ray Photoemission Spectroscopy of the Nickel Dihalides', Phys. Rev. B **33**, 8060 (1986).
8. J. Zaanen and G. A. Sawatzky, 'Strong Interference between Decay Channels and Valence Electron Rearrangements in Core Hole Spectroscopy', Phys. Rev. B **33**, 8074 (1986).
9. J. Zaanen, 'The Electronic Structure of Transition Metal Compounds in the Impurity Model', Thesis, University of Groningen (1986).
10. G. van der Laan, B. T. Thole, J. Zaanen, G. A. Sawatzky, J. C. Fuggle, R. Karnatak and J.-M. Esteva, 'Multiplet Effects in Near Edge XAS for Ground State Studies', J. Phys. (Paris) Coll. **C8**, 997 (1986).
11. A. M. Oles, J. Zaanen and P. Fulde, 'How Strongly are Electrons Correlated in the High T_c Superconducting Materials', Physica **148B**, 260 (1987).

12. J. Zaanen and G. A. Sawatzky, 'The Electronic Structure and Superexchange Interactions in Transition-Metal Compounds', *Can. J. Phys.***65**, 1262 (1987).
13. J. Zaanen and A. M. Oles, 'Canonical Perturbation Theory and the Two Band Model for High- T_c Superconductors', *Phys. Rev. B* **37**, 9423 (1988).
14. O. Gunnarsson, O. K. Andersen, O. Jepsen and J. Zaanen, 'Ab-Initio Calculations of the Parameters in the Anderson Model', Springer Series in Solid State Sciences, Vol. 81 'Core-level Spectroscopy in Condensed Systems', Eds. J. Kanamori and A. Kotani (Springer-Verlag, Berlin, Heidelberg, 1988).
15. J. Zaanen, A. T. Paxton, O. Jepsen and O. K. Andersen, 'Chain-fragment Doping and the Phase Diagram of $YBa_2Cu_3O_{7-x}$ ', *Phys. Rev. Lett.***60**, 2685 (1988).
16. J. Zaanen, O. Jepsen, O. Gunnarsson, A. T. Paxton, O. K. Andersen and A. Svane, 'What can be learned about High T_c from Local Density Theory?', *Physica C* **153-155**, 1636 (1988).
17. A. M. Oles and J. Zaanen, 'Absence of Pairing Mechanism due to Coupling of Oxygen Holes to Localized Spins in High T_c Superconductors', *Physica C* **153-155**, 1229 (1988).
18. A. M. Oles and J. Zaanen, 'Model Study of Antiferromagnetism in High T_c Superconducting Oxides', *J. Magn. Magn. Mat.***76-77**, 568 (1988).
19. A. M. Oles and J. Zaanen, 'Localized vs. Itinerant Picture of High- T_c Superconducting Oxides', *Int. J. Mod. Phys.* **1**, 751 (1988).
20. O. Gunnarsson, O. K. Andersen, O. Jepsen and J. Zaanen, 'Density Functional Calculation of the Parameters in the Anderson Model: Application to Mn in CdTe', *Phys. Rev. B* **39**, 1708 (1989).
21. F. U. Hillebrecht, J. Fraxedas, L. Ley, H. J. Trodhal, J. Zaanen, W. Braun, M. Mast, H. Petersen, M. Schaible, L. C. Bourne, P. Pinsukanjana and A. Zettl, 'Experimental Electronic Structure of $Bi_2CaSr_2Cu_2O_{8+y}$ ', *Phys. Rev. B* **39**, 236 (1989).
22. J. Zaanen, 'Band Formation and the Trivalent Limit of the High- T_c Oxides', *Proc. International Symposium on High T_c Superconductivity*, Jaipur (ed. K. B. Garg, Oxford, New Dehli, 1989).
23. A. M. Oles and J. Zaanen, 'Mean-Field Theories of the Two-Band Model and the Magnetism in High T_c Oxides', *Phys. Rev. B* **39**, 9175 (1989).
24. F. U. Hillebrecht, J. Fraxedas, L. Ley, H. J. Trodhal and J. Za-

- aanen, 'Photoemission Spectroscopy of $Bi_2CaSr_2Cu_2O_{8+y}$ in the Normal and Superconducting State', in 'High- T_c superconductors, Electronic Structure', Proceedings of the International Symposium on the Electronic Structure of High T_c Superconductors, pp181 (eds. A. Bianconi and A. Marcelli, Pergamon, Oxford, 1989).
25. J. Zaanen, M. Alouani and O. Jepsen, 'X-ray Absorption of $YBa_2Cu_3O_7$: a Band Picture.', *Phys. Rev. B* **40**, 837 (1989).
 26. J. Zaanen and O. Gunnarsson, 'Charged Magnetic Domain Lines and the Magnetism of the High- T_c Superconducting Oxides', *Phys. Rev. B* **40**, 7391 (1989).
 27. J. Zaanen and O. Gunnarsson, 'Local Spin Screening in the High T_c Superconductors', *Physica C* **162-164**, 821 (1989).
 28. L. F. Feiner and J. Zaanen, 'Charged Vortices in the Negative U Hubbard Model', *Physica C* **162-164**, 777 (1989).
 29. L. F. Feiner and J. Zaanen, 'Orbital Dynamics and Jahn-Teller Coupling in the CuO_2 planes of the High T_c cuprates; in 'Springer Series of Solid State Sciences', Proc. of the International Winter-school on Electronic Properties of High Temperature Superconductors, Kirchberg, Austria (Springer, Heidelberg, 1990).
 30. J. Zaanen and G. A. Sawatzky, 'Systematics in Band Gaps and Optical Spectra of 3d Transition Metal Compounds', *J. Sol. State Chem.* **88**, 8 (1990).
 31. J. Zaanen and G. A. Sawatzky, 'Photoemission and the Electronic Structure of 3d Transition Metals', *Prog. Theor. Phys. Suppl.* **101**, 231 (1990).
 32. J. Zaanen, A. M. Oles and L. F. Feiner, 'Spin Fluctuations and Orbital Dynamics in Cuprates', in NATO ASI Series B246 'Dynamics of Magnetic Fluctuations in High-Temperature Superconductors' (Plenum Press, New York, 1991).
 33. A. M. Oles, J. Zaanen and V. Drchal, 't-J Model for Triplet Holes', *Int. J. Mod. Phys. B* **5**, 131 (1991).
 34. V. I. Anisimov, J. Zaanen and O. K. Andersen, 'Band Theory and Mott Insulators: Hubbard U instead of Stoner I', *Phys. Rev. B* **44**, 943 (1991).
 35. C. M. Varma, J. Zaanen and K. Raghavachari, 'Superconductivity in the Fullerenes', *Science*, **254**, 989 (1991).
 36. A. M. Oles, J. Zaanen and P. Horsch, 'Triplet Hole Propagation and High- T_c Superconductivity', *Physica C* **185-189**, 1603 (1991).
 37. J. Zaanen, 'Theory of Correlated Holes (and Electrons): from

- Satellites to Luttinger Liquids', Chapter 4 in 'Unoccupied Electronic States' (Springer Topics in Applied Physics 69, eds. J. C. Fuggle and J. E. Inglesfield, Springer, Heidelberg, 1992).
38. V. I. Anisimov, M. A. Korotin, J. Zaanen and O. K. Andersen, 'Spin-bags, Polarons and Impurity Potentials in $La_{2-x}Sr_xCuO_4$ from first principles', Phys. Rev. Lett. **68**, 345 (1992).
 39. T. T. M. Palstra, R. C. Haddon, A. F. Hebard and J. Zaanen, 'Electronic Transport Properties of K_3C_{60} ', Phys. Rev. Lett., **68**, 1054 (1992).
 40. J. Zaanen, A. M. Oles and P. Horsch, 'Generalizing the t-J model: Triplet Holes', Phys. Rev. B **46**, 5798 (1992).
 41. O. Gunnarsson and J. Zaanen, 'Impurity Spin Screening in Low Density Fermi Liquids', Phys. Rev. B **46**, 15019 (1992).
 42. C. M. Varma and J. Zaanen, 'Fullerene superconductivity and the dynamic Jahn-Teller effect - response', Science **255**, 1490 (1992).
 43. I. I. Mazin, O. K. Andersen, A. I. Liechtenstein, O. Jepsen, V.P. Antropov, S.N. Rashkeev, V.I. Anisimov, J. Zaanen, R.O. Rodriguez and M. Methfessel, 'Density Functional Theory for Phonons, Electrons and their Interaction in $YBa_2Cu_3O_7$ ', Proc. 'Lattice Effects in High Temperature Superconductors', Santa Fe (World Scientific, Singapore, 1993).
 44. P. B. Littlewood, J. Zaanen, G. Aeppli and H. Monien, 'Spin Fluctuations in a Two Dimensional Marginal Fermi-Liquid', Phys. Rev. B **48**, 487 (1993).
 45. T.T.M. Palstra, M. L. Steigerwald, A. P. Ramirez, Y.-U. Kwon, S. M. Stuczynski, L. F. Schneemeyer, J. V. Waszczak and J. Zaanen, 'Electron Correlations on a Mesoscopic Scale: Magnetic Properties of Transition Metal-Telluride Cluster Compounds', Phys. Rev. Lett. **71**, 1768 (1993).
 46. J. Zaanen and A. M. Oleś, 'Carriers Binding to Excitons: Crystal Field Excitations in Doped Mott-Hubbard Insulators', Phys. Rev. B **48**, 7197 (1993).
 47. J. Bala, A. M. Oleś and J. Zaanen, 'Zhang-Rice Localization, Quasiparticle Dispersions and the Photoemission of NiO', Phys. Rev. Lett. **72**, 2600 (1994).
 48. J. Bala, A. M. Oleś and J. Zaanen, 'Zhang-Rice Localization and Quasiparticles in CuO_2 planes', Physica C **235**, 2291 (1994).
 49. A. M. Oleś and J. Zaanen, 'Magnetic Phases and Generalized $t - J$ Models in doped Mott-Hubbard Insulators', Acta Physica

- Polonica A **85**, 145 (1994).
50. A. M. Oleś and J. Zaanen, ‘Spin-orbital Models and d-d Excitons in doped Mott-Hubbard Insulators’, Acta Physica Polonica B **24**, 825 (1994).
 51. T. T. M. Palstra, M. L. Steigerwald, A. P. Ramirez and J. Zaanen, ‘Electron Correlations in Transition Metal-Telluride Cluster Compounds’, Physica B **199-200**, 619 (1994).
 52. J. Zaanen and P. B. Littlewood, ‘Freezing Electron Correlations by Polaronic Instabilities in Doped La_2NiO_4 ’, Physical Review B **50**, 7222 (1994).
 53. A. M. Oleś, J. Bala and J. Zaanen, ‘ $t-J$ Model and Quasiparticles in NiO and CuO ’, in: Superconductivity and strongly correlated electron systems (eds. C. Noce and A. Romano, World Scientific, Singapore, 1994).
 54. J. Bala, A. M. Oleś and J. Zaanen, ‘Spin Polarons in the $t-t'-J$ Model’, J. Magn. Magn. Mat. **140**, 1939 (1995).
 55. J. Bala, A. M. Oleś and J. Zaanen, ‘Spin Polarons in the $t-t'-J$ Model’, Phys. Rev. B **52**, 4597 (1995).
 56. L. F. Feiner, A. M. Oleś and J. Zaanen, ‘Quantum Fluctuations in the d^9 Model’, J. Magn. Magn. Mat. **140**, 1941 (1995).
 57. A. M. Oleś, L. F. Feiner and J. Zaanen, ‘Effective d^8 model: Phase Diagram’, J. Magn. Magn. Mat. **140**, 1269 (1995).
 58. A. I. Liechtenstein, V. I. Anisimov and J. Zaanen, ‘Density Functional Theory and Strong Interactions: Orbital Ordering in Mott-Hubbard Insulators’, Phys. Rev. B **52**, 5467 (1995).
 59. J. Bala, A. M. Oleś and J. Zaanen, ‘Quasiparticles in Strongly Correlated Models of Transition Metal Compounds’, Mol. Phys. Rep. **12**, 11 (1995).
 60. E. Pellegrin, C. T. Chen, J. Zaanen and J. Fink, ‘Symmetry of hole states in $La_{2-x}Sr_xCuO_{4+\delta}$ and $La_{2-x}Sr_xNiO_{4+\delta}$ ’, Physica B **209**, 487 (1995).
 61. E. Pellegrin, J. Zaanen, H.-J. Lin, G. Meigs, C. T. Chen, G.-H. Ho, H. Eisaki and S. Uchida, ‘ $O1s$ X-ray Absorption of $La_{2-x}Sr_xNiO_4$: Holes, Polarons and Excitons’, Phys. Rev. B **53**, 10667 (1996).
 62. J. Zaanen, M. L. Horbach and W. van Saarloos, ‘Charged Domain Wall Dynamics in Doped Antiferromagnets and the Spin Fluctuations in Cuprate Superconductors’, Phys. Rev. B **53**, 8671 (1996).
 63. J. Zaanen and A. M. Oleś, ‘Striped Phase in the Cuprates as a

- Semiclassical Phenomenon', Festschrift Fulde, Ann. Physik **5**, 224 (1996).
64. H. Eskes, R. Grimberg, W. van Saarloos and J. Zaanen, 'Quantizing Charged Magnetic Domain Walls: Strings on a Lattice', Phys. Rev. B **54**, R724 (1996).
 65. J. Bala, A. M. Oleś and J. Zaanen, 'Quasiparticles in the spin-fermion model for CuO_2 planes', Phys. Rev. B **54**, 10161 (1996).
 66. J. Zaanen, O. Y. Osman, H. Eskes and W. van Saarloos, 'Dynamical stripe correlations in cuprate superconductors', J. Low Temp. Phys. **105**, 569 (1996).
 67. A. M. Oleś, L. F. Feiner and J. Zaanen, 'Phase diagram of the spin-orbital model', Acta Phys. Pol. A **92**, 367 (1997).
 68. J. Zaanen, 'Quantum Werelden, Klein en Groot', jaarboek vereniging van Akademie onderzoekers, 1997.
 69. L. F. Feiner, A. M. Oleś and J. Zaanen, 'Quantum melting of magnetic order due to orbital fluctuations', Phys. Rev. Lett. **78**, 2799 (1997).
 70. C. N. A. van Duin and J. Zaanen, 'The origin of the quantum-critical transition in the bilayer Heisenberg model', Phys. Rev. Lett. **78**, 3019 (1997).
 71. A. M. Oleś and J. Zaanen, 'Quadrupling of unit cell in half-filled domain walls in the cuprates', Physica B **230-232**, 925 (1997).
 72. A. M. Oleś, J. Zaanen and L. F. Feiner, 'Spin liquid stabilized by orbital degeneracy', Mol. Phys. Rep. **17**, 185 (1997).
 73. J. Zaanen and W. van Saarloos, 'Dynamical stripe correlations and the spin fluctuations in cuprate superconductors', Physica C **282-287**, 178 (1997).
 74. T. T. M. Palstra, A. P. Ramirez, S.-W. Cheong, B. R. Zegarski, P. Schiffer and J. Zaanen, 'Transport Mechanisms in doped $LaMnO_3$: Evidence for Polaron Formation', Phys. Rev. B **56**, 5104 (1997).
 75. C. N. A. van Duin and J. Zaanen, 'Charge- versus spin driven stripe order: the role of transversal spin fluctuations', Phys. Rev. Lett. **80**, 1513 (1998).
 76. J. Zaanen, 'Current ideas on the origin of stripes', J. Phys. Chem. Sol. **59**, 1769 (1998).
 77. H. Eskes, O. Y. Osman, R. Grimberg, W. van Saarloos and J. Zaanen, 'Charged domain walls as quantum strings living on a lattice', Phys. Rev. B **58**, 6963-6981 (1998).

78. L. F. Feiner, A. M. Oles and J. Zaanen, 'Quantum disorder versus order-out-of-disorder in the Kugel-Khomskii model', *J. Phys. Cond. Mat.* **10**, L555 (1998)
79. J. Zaanen, O. Y. Osman and W. van Saarloos, 'Metallic stripes: separation of charge-, spin-, and string fluctuation', *Phys. Rev. B* **58**, R11868 (1998).
80. A. M. Oleś, L. F. Feiner and J. Zaanen, 'Valence Bond Solids in Three Dimensions', *J. Magn. Magn. Mat.*, in press (1999)
81. J. Tworzydło, O. Y. Osman, C. N. A. van Duin and J. Zaanen, 'Quantum magnetism in the stripe phase: bond- versus site order', *Phys. Rev. B* **59**, 115 (1999).
82. O. Y. Osman, W. van Saarloos and J. Zaanen, 'Spontaneous orientation of a quantum lattice string', in: "Stripes and related phenomena", edited by A. Bianconi and N. L. Saini (Kluwer, New York, 2000).
83. J. Tworzydło, C. N. A. van Duin and J. Zaanen, 'Spin-only approach to quantum magnetism in the ordered stripe phase', in: "Stripes and related phenomena", edited by A. Bianconi and N. L. Saini (Kluwer, New York, 2000).
84. J. Zaanen, 'Quantum phase transitions in cuprates: stripes and antiferromagnetic supersolids', *Physica C* **317-318**, 217 (1999).
85. J. Zaanen, 'Classical frustration and quantum disorder in spin-orbital models', J. Zaanen, L. F. Feiner and A. M. Oleś, *Mat. Sci. Eng. B* **63**, 140 (1999).
86. I. M. Abu-Shiekh, O. O. Bernal, A. A. Menovsky, H. B. Brom and J. Zaanen, 'Similarity of slow stripe fluctuations between Sr-doped cuprates and oxygen doped nickelates', *Phys. Rev. Lett.* **83**, 3309 (1999).
87. J. Zaanen, 'Superconductivity: self-organized one dimensionality', *Science* **286**, 251 (1999).
88. J. Bala, A.M. Oles and J. Zaanen, 'Origin of band and localized electron states in photoemission of NiO', *Phys. Rev. B* **61**, 13573-13587 (2000).
89. J. Zaanen, 'High-temperature superconductivity - Stripes defeat the Fermi liquid', *Nature* **404**, 714-715 (2000).
90. A.M. Oles, L.F. Feiner and J. Zaanen, 'Quantum melting of magnetic long-range order near orbital degeneracy: Classical phases and Gaussian fluctuations', *Phys. Rev. B* **61**, 6257-6287 (2000).
91. C.N.A. van Duin and J. Zaanen, 'Interplay of superconductivity

- and magnetism in strong coupling', *Phys. Rev. B* **61**, 3676-3690 (2000).
92. J. Zaanen, 'Order out of disorder in a gas of elastic quantum strings in 2+1 dimensions', *Phys. Rev. Lett.* **84**, 753-756 (2000).
 93. M. Bosch, W. van Saarloos and J. Zaanen, 'Do shifting Bragg peaks reveal fractionally charged kinks?', *Phys. Rev. B* **63**, 2501 (2001)
 94. J. Zaanen and Z. Nussinov, 'Stripes and nodal fermions as two sides of the same coin', in 'Open Problems in Strongly Correlated Electron Systems' (Nato Science Series II/15, eds. J. Bonca, P. Prelovsek, A. Ramsak and S. Sarkar, Kluwer Ac. Pub., Dordrecht, 2001) .
 95. G.B. Teitel'baum, I.M. Abu-Shiekah, O. Bakharev, H.B. Brom and J. Zaanen, 'Spin dynamics and ordering of a cuprate stripe-antiferromagnet', *Phys. Rev. B* **63**, 20507 (2000).
 96. H.B. Brom, I.M. Abu-Siekah, O. Bakharev, O.O. Bernal, P.H. Kes, Ming-Li, E.G. Nikolaev, G.B. Teitel'Baum, A.A. Nugroho, A.A. Menovsky and J. Zaanen, 'Stripe and spin dynamics in hole doped La₂NiO₄, La₂CuO₄, Bi₂Sr₂CaCu₂O₈ and electron doped Nd_{1.85}Ce_{0.15}CuO₄ seen by nuclear resonance', *Int. J. Mod. Phys. B* **14**, 3368 (2000).
 97. S.I. Mukhin, W. van Saarloos and J. Zaanen, 'The gas of elastic quantum strings in 2+1 dimensions: finite temperatures', submitted *Phys. Rev. B* **64**, 115105 (2001).
 98. J. Zaanen, O.Y. Osman, H.V. Kruis, Z. Nussinov and J. Tworzydło, 'The geometric order of stripes and Luttinger liquids', *Phil. Mag. B* **81**, 1485 (2001).
 99. J. Zaanen, 'High Temperature superconductivity – Quantum salad dressing', *Nature* **415**, 379 (2002).
 100. I. Martin, A.V. Balatsky and J. Zaanen, 'Impurity states and interlayer tunneling in high temperature superconductors', *Phys. Rev. Lett.* **88**, 097003 (2002).
 101. J. Zaanen, 'Why high T_c is exciting', *Annales Universitatis Mariae Curie-Sklodowska Lublin - Polonia* **57**, 9 - 22 (2002).
 102. Z. Nussinov and J. Zaanen, 'Stripe fractionalization I: the generation of Ising local symmetry', *J. Phys. IV France* **12**, Pr9-245 (2002).
 103. J. Zaanen and Z. Nussinov, 'Stripe fractionalization II: the quantum spin nematic and the Abrikosov lattice', *Physica Status Solidi B* **236**, 332 (2003).

104. J. Zaanen, ‘Superconductivity: pebbles in the nodal pond’, *Nature* **422**, 569 (2003).
105. D. van der Marel, H.J.A. Molegraaf, J. Zaanen, Z. Nussinov, F. Carbone, A. Damascelli, H. Eisaki, M. Greven, P.H. Kes and M.Li, ‘Quantum critical behaviour in a high-T-c superconductor’, *Nature* **425**, 271 (2003).
106. H.B. Brom and J. Zaanen, ‘Magnetic Ordering phenomena and dynamic fluctuations in cuprate superconductors and insulating nickelates’, *Handbook of Magnetic Materials*, Vol. 11, 379 (ed. K.H.J Buschow, Elsevier Science B.V., 2003).
107. J. Zaanen, Z. Nussinov and S.I. Mukhin, ‘Duality in 2+1D quantum elasticity: superconductivity and quantum nematic order’, *Annals of Physics* **310**, 181 (2004).
108. H.V. Kruis, I.P. McCulloch, Z. Nussinov and J. Zaanen, ‘Geometry and topological order in the Luttinger liquid state’, *Europhys. Lett.* **65**, 512 (2004).
109. H. Kleinert and J. Zaanen, ‘World Nematic Crystal Model of Gravity Explaining the Absence of Torsion’, *Phys. Lett. A* **324**, 361 (2004).
110. H.V. Kruis, I.P. McCulloch, Z. Nussinov and J. Zaanen, ‘Geometry and the Hidden Order of Luttinger Liquids: the Universality of Squeezed Space’, *Phys. Rev. B* **70**, 075109 (2004).
111. O.N. Bakharev, I.M. Abu-Shiekh, H.B. Brom, A.A. Nugroho, I.P. McCulloch and J. Zaanen, ‘NMR evidence for two-step phase-separation in $Nd_{1.85}Ce_{0.15}CuO_{4-\delta}$ ’, *Phys. Rev. Lett.* **93**, 037002 (2004).
112. J. Zaanen and B. Hosseinkhani, ‘Thermodynamics and quantum criticality in cuprate superconductors’, *Phys. Rev. B* **70**, 230401 (2004).
113. J. Zaanen, ‘Superconductivity – Why the Temperature is High’, *Nature* **430**, 512 (2004).
114. B. Hosseinkhani and J. Zaanen, ‘Quantum Criticality and the Metal-Insulator in 2D: a Critical Test’, *cond-mat/0408573* (2004).
115. A. Diller, Alia, E. Roy, P. Gast, H.J. van Gorkom, J. Zaanen, H.J.M.de Groot, C. Glaubitiz and J. Matysik, ‘Photo-CIDNP solid state NMR on photosystem I and II: what makes P680 special ?’, *Photosynthesis Research* **84**, 303 (2005).
116. J. van Wezel, J. van den Brink and J. Zaanen, ‘an Intrinsic Limit to Quantum Coherence due to Spontaneous Symmetry Breaking’,

- Phys. Rev. Lett. **94**, 230401 (2005).
117. J. Zaanen, 'Journal Club', Nature **436**, 445 (2005).
 118. J. van Wezel, J. van den Brink and J. Zaanen, 'Quantumbits verliezen Spontaan Quantuminformatie', NTVN **71**, 293 (2005).
 119. J. Zaanen, 'Technology Meets Quantum Criticality', Nature Materials **4**, 655 (2005).
 120. N. Mannella, W. Yang, X.J. Zhou, H. Zheng, J.F. Mitchell, J. Zaanen, T.P. Devereaux, N. Nagaosa and Z.X. Shen, 'Nodal Quasiparticle in pseudogapped colossal magnetoresistive manganites', Nature **438**, 474 (2005).
 121. C.J. Wu, S.C. Zhang and J. Zaanen, 'Spin-Orbit Coupling Induced Magnetism in the d-Density Wave State of $La_{2-x}Ba_xCuO_4$ superconductors', Phys. Rev. Lett. **95**, 247007 (2005).
 122. W. Meevasana, N.J.C. Ingle, D.H. Lu, J.R. Shi, F. Baumberger, K.M. Shen, W.S. Lee, T. Cuk, H. Eisaki, T.P. Devereaux, N. Nagaosa, J. Zaanen and Z.X. Shen, 'Doping dependence of the coupling of electrons to bosonic modes in the single-layer Bi-cuprate, Bi2201', Phys. Rev. Lett. **96**, 2995 (2006).
 123. J. Zaanen, S Chakravarty, T. Senthil P. Anderson, P. Lee, J. Schmalian, M. Imada, D. Pines, M. Randeria, C. Varma, M. Vojta and M. Rice, 'Towards a complete theory of high T-c', Nature Physics, **2**, 138 (2006).
 124. J. Zaanen, 'Superconductivity - Quantum stripe search', Nature **440**, 1118 (2006).
 125. V. Cvetkovic, Z. Nussinov and J. Zaanen, 'Topological kinematic constraints: dislocations and the glide principle', Philosophical Magazine, **86**, 2995 (2006).
 126. V. Cvetkovic and J. Zaanen, 'Quantum smectic as a dislocation Higgs phase', Phys. Rev. Lett. **97**, 045701 (2006).
 127. J. van Wezel, J. Zaanen and J. van den Brink, 'Relation between decoherence and spontaneous symmetry breaking in many-particle qubits', Phys. Rev. B **74**, 094430 (2006).
 128. W. Meevasana, T.P. Devereaux, N. Nagaosa, Z.X. Shen and J. Zaanen, Calculation of overdamped c-axis charge dynamics and the coupling to polar phonons in cuprate superconductors, Phys. Rev. Lett. **74**, 174524 (2006).
 129. V. Cvetkovic and J. Zaanen, 'Vortex duality: Observing the dual nature using order propagators', Phys. Rev. B **74**, 134504 (2006).

130. J. Zaanen, 'Watching rush hour in the world of electrons', *Science* **315**, 1372 (2007).
131. W. Meevasana, X.J. Zhou, S. Sahrakorpi, W.S. Lee, W.L. Yang, K. Tanaka, N. Mannella, T. Yoshida, D.H. Lu, Y.L. Chen, R.H. He, H. Lin, S. Komiya, Y. Ando, F. Zhou, W.X. Ti, J.W. Xiong, Z.X. Zhao, T. Sasagawa, T. Kakeshita, K. Fujita, S. Uchida, H. Eisaki, A. Fujimori, Z. Hussain, R.S. Markiewicz, A. Bansil, N. Nagaosa, J. Zaanen, T.P. Devereaux and Z.X. Shen, 'Hierarchy of multiple many-body interaction scales in high-temperature superconductors', *Phys. Rev. B* **75**, 174506 (2007).
132. J. Zaanen, 'Theoretical physics - A black hole full of answers', *Nature* **448**, 1000 (2007).
133. F. Kruger, S.D. Wilson, L. Shan, S.L. Li, Y. Huang, H.H. Wen, S.C. Zhang, P.C. Dai and J. Zaanen, 'Magnetic fluctuations in n-type high-T_c superconductors reveal breakdown of fermiology: Experiments and Fermi-liquid/RPA calculations', *Phys. Rev. B* **76**, 094506 (2007),
134. S.I. Mukhin, A. Mesaros, J. Zaanen and F.V. Kusmartsev, 'Enhanced electronic polarizability of metallic stripes and the universality of the bond-stretching phonon anomaly in high-temperature cuprate superconductors', *Phys. Rev.* **76**, 174521 (2007).
- 135 B.W.A. Leurs and J. Zaanen, 'The $SU(2)$ Gauge Theory of the Substantially Doped Mott-Insulator: the phase separated d+s superconductor', cond-mat/0702364 (2007).
- 136 B.W.A. Leurs, K.E. Luna, and J. Zaanen, 'Inhomogeneous states and nodal fermions in the $SU(2)$ gauge theory', ArXiv 0707.3709 (2007).
137. N. Mannella, W.L. Yang, K. Tanaka, X.J. Zhou, H. Zheng, J.F. Mitchell, J. Zaanen, T.P. Devereaux, N. Nagaosa, Z. Hussain and Z.X. Shen, 'Polaron coherence condensation as the mechanism for colossal magnetoresistance in layered manganites', *Phys. Rev. B* **76**, 233102 (2007).
138. J. Zaanen, J., Perspective - Quantum critical electron systems: The uncharted sign worlds, *SCIENCE* **319** (5867) 1205-1207 (2008).
139. J. Van Wezel, T. Oosterkamp, J. Zaanen, Towards an experimental test of gravity-induced quantum state reduction, *PHILOSOPHICAL MAGAZINE* **88** (7) 1005-1026 (2008).
140. B.W.A. Leurs, Z. Nazario, D.I. Santiago, J. Zaanen, Non-Abelian hydrodynamics and the flow of spin in spin-orbit coupled substances, *ANNALS OF PHYSICS* **323** (4) 907-945 (2008).

141. V. Cvetkovic, Z. Nussinov, S. Mukhin and J. Zaanen, 'Observing the fluctuating stripes in high-T-c superconductors', *Europhys. Lett.* **2** 27001 (2008).
142. J. Zaanen, F. Kruger, J-H. She, D. Sadri, S.I. Mukhin, Pacifying the Fermi-liquid: battling the devious fermion signs, *IRANIAN JOURNAL OF PHYSICS* **8** (2) 39-66 (2008).
143. K. Wu, Z.Y. Weng, J. Zaanen, Sign structure of the t-J model, *PHYSICAL REVIEW B* **77** (15) 155102 (2008).
144. A.S. Mischenko, N. Nagaosa, Z.X. Shen, G. De Filippis, V. Cataudella, T.P. Devereaux, C. Bernhard, K.W. Kim, J. Zaanen, Charge dynamics of doped holes in high Tc cuprate superconductors: A clue from optical conductivity, *PHYSICAL REVIEW LETTERS* **100** (16) 166401 (2008).
145. F. Kruger, J. Zaanen, Fermionic quantum criticality and the fractal nodal surface, *PHYSICAL REVIEW B* **78** (3) 035104 (2008).
146. J-H. She, D. Sadri, J. Zaanen, Statistics, condensation, and the Anderson-Higgs mechanism: Worldline path integral view, *PHYSICAL REVIEW B* **78** (14) 144504 (2008).
147. J. Zaanen, Condensed-Matter Physics, The pnictide code, *NATURE* **457** 7229 (2009).
148. J. Zaanen, Physics Fast Electrons Tie Quantum Knots, *SCIENCE* **323** 5916 (2009).
149. F. Kruger, S. Kumar, J. Zaanen, J. van den Brink, Spin-orbital frustrations and anomalous metallic state in iron-pnictide superconductors, *PHYSICAL REVIEW B* **79** 054504 (2009).
150. A. Mesaros, D. Sadri, J. Zaanen, The Berry phase of dislocations in graphene and valley conserving decoherence, *PHYSICAL REVIEW B* **79** 155111 (2009).
151. G.A. Sawatzky, I.S. Elfimov, J. van den Brink, J. Zaanen, Heavy-anion salvation of polarity fluctuations in pnictides, *EUROPEAN PHYSICS LETTERS* **86** 17006 (2009).
152. H.C. Jiang, F. Kruger, J.E. Moore, D.N. Sheng, J. Zaanen, Z.Y. Weng, Phase diagram of the frustrated, spatially anisotropic S=1 antiferromagnet on a square lattice, *PHYSICAL REVIEW B* **79** 174409 (2009).
153. M. Cubrovic, J. Zaanen, K. Schalm, String Theory, Quantum phase transitions and the emergent Fermi-liquid, *SCIENCE* **325** 366 (2009).
154. J-H. She, J. Zaanen, BCS Superconductivity in Quantum Critical

- Metals, PHYSICAL REVIEW B **80** 184518 (2009).
155. J. Zaanen, The specific heat jump at the superconducting transition and the quantum critical nature of the normal state of Pnictide superconductors, PHYSICAL REVIEW B **80** 212502 (2009).
 - 156 J. Zaanen, Journal Club, NATURE **462** 15 (2009).
 - 157 J-H. She, J. Zaanen, BCS Superconductivity in Quantum Critical Metals, PHYSICAL REVIEW B **80** 184518 (2009).
 - 158 W. Meevasana, X.J. Zhou, B. Moritz, C-C. Chen, R.H. He, S-I. Fujimori, D.H. Lu, S-K. Mo, R.G. Moore, F. Baumberger, T.P. Devereaux, D. van der Marel, N. Nagaosa, J. Zaanen, Z-X. Shen, Strong energy-momentum dispersion of phonon-dressed carriers in the lightly doped band insulator SrTiO₃, NEW JOURNAL OF PHYSICS **12** 023004 (2010).
 - 159 J. Zaanen, High-temperature superconductivity: The benefit of fractal dirt, NATURE **466** 825-827 (2010).
 - 160 S. Johnston, F. Vernay, B. Moritz, Z-X. Shen, N. Nagaosa, J. Zaanen, T.P. Devereaux, T.P., A Systematic Study of Electron-Phonon Coupling to Oxygen Modes across the Cuprates, PHYSICAL REVIEW B **82** 064513 (2010).
 - 161 A. Mesaros, D. Sadri, J. Zaanen, Parallel Transport of Electrons in Graphene Parallels Gravity, PHYSICAL REVIEW B **82** 073405 (2010).
 - 162 J-H. She, J. Zaanen, A.R. Bishop, A.V. Balatsky, stability of Quantum Critical Points in the Presence of Competing Orders, Phys. Rev. B **82** 165128 (2010).
 - 163 A. Mesaros, S. Papanikolaou, C.F.J. Flipse, D. Sadri, J. Zaanen, Electronic States of Graphene Grain Boundaries, PHYSICAL REVIEW B **82** 205119 (2010).
 - 164 A. Mesaros, S. Papanikolaou, C.F.J. Flipse and D. Sadri, J. Zaanen, Electronic States of Graphene Grain Boundaries, Physical Review B **82**, 205119 (2010).
 - 165 A. Geim, J. Zaanen, G. Bell, M. du Sautoy, M. Aspelmeyer, 50 Ideas to change science, NEW SCIENTIST **208** 2782 (2010).
 - 166 J.Zaanen, B. Overbosch, Mottness collapse and statistical quantum criticality, Philosophical Transactions of the Royal Society A **369**, 1599 (2011).
 - 167 A.J. Beekman, D. Sadri, J. Zaanen, Condensing Nielsen-Olsen strings and the vortex-boson duality in 3+1 and higher dimensions, New Journal of Physics **13**, 033004 (2011).

- 168 S-X. Yang, H. Fotsos, S-Q. Su, D. Galanakis, E. Khatami, J-H. She, J. Moreno, J. Zaanen and M. Jarrell, Proximity of the superconducting dome and the quantum critical point in the two-Dimensional Hubbard model, *Physical Review Letters* **106**, 047004 (2011).
- 169 L. Rademaker, J. Zaanen and H. Hilgenkamp, Prediction of the quantization of magnetic flux in double layer exciton superfluids, *Physical Review B* **83**, 012504 (2011).
- 170 J. Zaanen, High temperature superconductivity: the secret of the hourglass, *Nature* **471**, 314 (2011).
- 171 J. Zaanen, Haar van zwarte gaten en het wezen van hoge temperatuur supergeleiding, *Nederlands Tijdschrift voor Natuurkunde* **77**, 114 (2011).
- 172 C. Beekman, J. Zaanen and J. Aarts, Mesoscopic transport in ultrathin films of $\text{La}_{0.67}\text{Ca}_{0.33}\text{MnO}_3$, *Physical Review B* **83**, 235128 (2011) .
- 173 J. Zaanen, A modern, but way too short history of the theory of superconductivity at a high temperature, ArXiv: 1012.5461 (Chapter in "100 years of superconductivity", eds. H. Rochalla and P.H. Kes, Chapman and Hall, 2011.)
- 174 A. Mesaros, S. Papanikolaou and J. Zaanen, Straining topological insulators as a way to detect Majorana Fermions, *Physical Review B* **84**, 041409 (2011).
- 175 A. Mesaros, K. Fujita, H. Eisaki, J.C. Davis, S. Sachdev, J. Zaanen, E.-A. Kim and M. Lawler, How topological defects couple the smectic and nematic electronic structure of the cuprate pseudogap states, *Science* **333**, 426 (2011).
- 176 J. Zaanen, de God van Einstein, chapter in "Resonanties, verkenningen tussen kunst en wetenschap" (ed. M. Cobussen, Leiden Univ. Press, 2011).
- 177 M. Cubrovic, J. Zaanen and K. Schalm, Constructing the AdS dual of a Fermi liquid: AdS Black holes with Dirac hair, *Journal of High Energy Physics*, 1110:017 (2011).
- 178 E. Gubankova, J. Brill, M. Cubrovic, K. Schalm, P. Schijven and J. Zaanen, Holographic fermions in external magnetic fields, *Physical Review D* **84**, 106003 (2011).
- 179 J.-H. She, B.J. Overbosch, Y.-W. Sun, Y. Liu, K.E. Schalm, J.A. Mydosh and J. Zaanen, Observing the origin of superconductivity in quantum critical metals, *Physical Review B* **84**, 144527 (2011).

- 181 M. Cubrovic, Y.Liu, K. Schalm, Y.W. Sun and J. Zaanen, Spectral probes of the holographic Fermi ground state: dialing between the electron star and AdS Dirac hair, *Physical Review D* **84**, 086002 (2011).
- 182 A.J. Beekman and J. Zaanen, Electrodynamics of Abrikosov vortices: the field theoretical formulation, *Frontiers of Physics* **6**, 357 (2011) .
- 183 K. Wu, Z-Y. Weng and J. Zaanen, Non-Fermi liquids for sustainable energy:statistical fluxes and the sodium cobaltate Curie-Weiss metal, *Physical Review B* **84**, 113113 (2011).
- 184 C. Song, G. Psakis, C. Lang, J. Mailliet, J. Zaanen, W. Gartner, J. Hughes and J. Matysik, On the collective nature of phytochrome photoactivation, *Biochemistry* **50**, 10987 (2011) .
- 185 L. Rademaker, K. Wu, H. Hilgenkamp and J. Zaanen, The dynamical frustration of interlayer excitons delocalizing in bilayer quantum antiferromagnets, *European Physics Letters* **97**, 27004 (2012).
- 186 J. Zaanen and A.J. Beekman, The emergence of gauge invariance: the stay-at-home versus local-global duality, *Annals of Physics* **327**, 1146 (2012).
- 187 V. Juricic, A. Mesaros, R.J. Slager and J. Zaanen, Universal probes of two-dimensional topological insulators: dislocation and pi-flux, *Physical Review Letters* **108**, 106403 (2012).
- 188 K. Fujita, A. Mesaros, M.J. Lawler, S. Sachdev, J. Zaanen, H. Eisaki, S. Uchida, E.A. Kim and J.C. Davis, Spectroscopic imaging STM studies of broken electronic symmetries in underdoped cuprates, *Journal of Physics – Conference Series* **400**, 022022 (2012).
- 189 K. Fujita, A. Mesaros, M.J. Lawler, S. Sachdev, J. Zaanen, H. Eisaki, S. Uchida, E.A. Kim and J.C. Davis, Spectroscopic imaging STM studies of broken electronic symmetries in underdoped cuprates, *Physica B* **407**, 1859 (2012).
- 190 L. Rademaker, K. Wu and J. Zaanen, Dynamics of a single exciton in strongly correlated bilayer, *New Journal of Physics* **14**, 083040 (2012).
- 191 A.J. Beekman and J. Zaanen, Type II Bose Mott insulators, *Physical Review B* **86**, 125129 (2012).
- 192 Y. Liu, K. Schalm, Y.-W. Sun and J. Zaanen, Lattice potentials in holographic non Fermi-liquids: hybridizing local quantum criticality, *Journal of High Energy Physics* **10**, 036 (2012).

- 193 M. Goykhman, A. Parnachev and J. Zaanen, Fluctuations in finite density holographic quantum liquids, *Journal of High Energy Physics* **10**, 045 (2012).
- 194 R.J. Slager, A. Mesaros, V. Juricic and J. Zaanen, The space group classification of topological band-insulators, *Nature Physics* **9**, 98 (2013).
- 195 A. Mesaros, R.J. Slager, J. Zaanen and V. Juricic, Zero-energy states bound to a magnetic pi-flux vortex in a two dimensional topological insulator, *Nuclear Physics B* **867**, 977 (2013).
- 196 C. Song, T. Rohmer, M. Tiersch, J. Zaanen, J. Hughes and J. Matysik, Solid State NMR spectroscopy to probe photoactivation in canonical phytochromes, *Photochemistry and Photobiology* **89**, 259 (2013).
- 197 J. Zaanen, High temperature superconductivity: the sound of the hidden order, *Nature* **498**, 41 (2013).
- 198 A.J. Beekman, K. Wu, V. Cvetkovic and J. Zaanen, Deconfining the rotational Goldstone mode: the superconducting quantum liquid crystal in 2+1 dimensions, *Physical Review B* **88**, 024121 (2013).
- 199 L. Rademaker, J. van den Brink, H. Hilgenkamp and J. Zaanen, Enhancement of spin propagation due to interlayer exciton condensation, *Physical Review B* **88**, 121101(R) (2013).
- 200 E.Gubankova, J. Brill, M. Cubrovic, K. Schalm, P. Schijven and J. Zaanen, Holographic description of strongly correlated electrons in external magnetic fields, Chapter 21 in *Lecture Notes in Physics "Strongly interacting matter in magnetic fields"* (eds D. Kharzeev, K. Landsteiner, A. Schmitt, H.-U. Yee, Springer, 2013).
- 201 J. Zaanen, Holographic duality: stealing dimensions from metals, *Nature Physics* **9**, 609 (2013).
- 202 L. Rademaker, Y. Pramudya, J. Zaanen and V. Dobrosavljevic, Influence of long-range interactions on charge ordering phenomena on a square lattice, *Physical Review E* **88**, 032121 (2013).
- 203 J.-H. She and J. Zaanen, Superconductivity and fermionic quantum criticality, *Physics C* **493**, 34 (2013).
- 204 Y. Liu, K. Schalm, Y.-W. Sun, and J. Zaanen, Bose-Fermi competition in holographic metals, *Journal of High Energy Physics* **10**, 064 (2013).
- 205 M.V. Medvedyeva, E. Gubankova, M. Cubrovic, K. Schalm and J. Zaanen, Quantum corrected phase diagram of holographic fermions,

- Journal of High Energy Physics **12**, 025 (2013).
- 206 L. Rademaker, S. Johnston, J. Zaanen and J. van den Brink, Determinant quantum Monte Carlo study of exciton condensation in the bilayer Hubbard model, *Physical Review B* **88**, 235115 (2013).
- 207 L. Rademaker, J. van den Brink, J. Zaanen, H. Hilgenkamp, Exciton condensation in strongly correlated electron bilayers, *Physical Review B* **88**, 235127 (2013).
- 208 Y. Liu, K. Schalm, Y.-W. Sun and J. Zaanen, BCS instabilities of electron stars to holographic superconductors, *Journal of High Energy Physics* **5**, 122 (2014).
- 209 R.A. Davison, K. Schalm and J. Zaanen, holographic duality and the resistivity of strange metals, *Physical Review B* **89**, 245116 (2014).
- 210 D. Forcella, J. Zaanen, D. Valentinis and D. van der Marel, Electromagnetic properties of viscous charged fluids, *Physical Review B* **90**, 035143 (2014).
- 211 T.H. Oosterkamp and J. Zaanen, A clock containing a massive object in a superposition of states; what makes Penrosian wave function collapse tick?, arXiv:1401.0176 (2014).
- 212 R.J. Slager, A. Mesaros, V. Juricic and J. Zaanen, The conspiracy of electronic topology and lattice symmetry: dislocation line modes in topological band insulators, *subm. Phys. Rev. Lett.* (arXiv:1401.4044).
- 213 K. Wu, L.Rademaker and J. Zaanen, How bilayer excitons can greatly enhance thermoelectric efficiency, *Physical Review Applied* (in press, 2014).
- 214 N. Callebaut, B. Craps, F. Galli, D.C. Thompson, J. Vanhoof, J. Zaanen and H. Zhang, Holographic quenches and fermionic spectral functions, *Journal of High Energy Physics* (in press, arXiv:1407.5975).
- 215 K. Liu, Z. Nussinov, R.J. Slager, K. Wu and J. Zaanen, Classification of nematic order in 2+1D: dislocation melting and $O(2)/Z_N$ lattice gauge theory, submitted *Physical Review B* (arXiv:1405.2963).
- 216 B. Keimer, S.A. Kivelson, M.R. Norman, S. Uchida and J. Zaanen, High temperature Superconductivity in the Cuprates, submitted *Nature* (arXiv:1409.4673).
- 217 J. Zaanen, Quantum matter: Electron mirages and high T_c superconductivity in a nano-sliced iron salt, *Nature* (in press, 2014)
- 218 J. Zaanen, Y. Liu, Y.-W. Sun and K. Schalm, *Holographic duality and condensed matter physics* (Cambridge University Press,

Cambridge, to be published in 2015).