LIST OF PUBLICATIONS
(Claus Kiefer)

1. BOOKS

1. *Decoherence and the Appearance of a Classical World in Quantum Theory*,
   Springer, Berlin (1996). Second edition 2003.
   (with E. Joos, H. D. Zeh, D. Giulini, J. Kupsch, and I.-O. Stamatescu)

2. *Quantentheorie*,
   S. Fischer, Frankfurt am Main (2002). Third edition 2004.

3. *Gravitation*,
   S. Fischer, Frankfurt am Main (2003).

4. *Quantum Gravity*,
   Oxford University Press, Oxford (2004). Third edition 2012.

5. *Der Quantenkosmos*,
   S. Fischer, Frankfurt am Main (2008). Third edition 2009.

6. Editor of: *A. Einstein, B. Podolsky, N. Rosen: Kann die quantenmechanische Beschreibung der physikalischen Realität als vollständig betrachtet werden?*, Klassische Texte der Wissenschaft (Springer Spektrum, Berlin, 2015).

7. *Gravitationswellen* (Springer Spektrum, Wiesbaden, 2017).
   (with D. Giulini)

2. PROCEEDINGS (EDITOR)

8. *Black Holes: Theory and Observation*,
   Lecture Notes in Physics 514, Springer, Berlin (1998).
   (joint editor with F.W. Hehl and R. Metzler)

9. *Decoherence: Theoretical, Experimental, and Conceptual Problems*,
   Lecture Notes in Physics 538, Springer, Berlin (2000).
   (joint editor with P. Blanchard, D. Giulini, E. Joos, and I.-O. Stamatescu)

10. *Quantum Gravity: From Theory to Experimental Search*, Lecture Notes in Physics 631, Springer, Berlin (2003). (joint editor with D. Giulini and C. Lämmerzahl)

11. *Proceedings, 7th International Workshop : Spacetime - Matter - Quantum Mechanics. (DICE2014) : Castiglioncello, Tuscany, Italy, September 15-19, 2014*, *Journal of Physics, Conference Series*, **626** (2015). (joint editor with H. T. Elze, L. Diósi, L. Fronzoni, J. J. Halliwell, E. Prati, and G. Vitiello)

12. *Proceedings, 8th International Workshop : Spacetime - Matter - Quantum Mechanics. (DICE2016) : Castiglioncello, Tuscany, Italy, September 12-16, 2014*, *Journal of Physics, Conference Series*, **880** (2017). (joint editor with H. T. Elze, L. Diósi, L. Fronzoni, J. J. Halliwell, E. Prati, and G. Vitiello)

3. REVIEWS

13. Kosmologische Grundlagen der Irreversibilität, *Physikalische Blätter* **49**, 1027–1029 (1993).

14. The semiclassical approximation to quantum gravity, in: *Canonical gravity: From classical to quantum*, edited by J. Ehlers and H. Friedrich (Springer, Berlin, 1994), pp. 170–212.

15. Das Informationsproblem bei Schwarzen Löchern, *Physikalische Blätter* **52**, 366–367 (1996).

16. Quanteneigenschaften Schwarzer Löcher, *Physik in unserer Zeit* **28**, 22–30 (1997).

17. Towards a full quantum theory of black holes, in: *Black Holes: Theory and Observation*, edited by F.W. Hehl, C. Kiefer, and R. Metzler (Springer, Berlin, 1998), pp. 416–450.

18. Decoherence: Concepts and Examples, in: *Quantum Future*, edited by P. Blanchard and A. Jadczyk (Springer, Berlin, 1999), pp. 105–128. (with E. Joos)

19. Thermodynamics of black holes and Hawking radiation, in: *Classical and Quantum Black Holes*, Studies in High Energy Physics, Cosmology and Gravitation, edited by P. Fré, V. Gorini, G. Magli, and U. Moschella (IOP Publishing, Bristol, 1999), pp. 17–74.

20. Conceptual issues in quantum cosmology,
in: *Towards quantum gravity*, edited by J. Kowalski-Glikman (Springer, Berlin, 2000), pp. 158–187.

21. On the interaction of mesoscopic quantum systems with gravity,
Annalen der Physik **14**, 253–278 (2005).
(with C. Weber)

22. Einstein und die Folgen, Teil I,
Physik in unserer Zeit **36** (January), 12–18 (2005).

23. Einstein und die Folgen, Teil II,
Physik in unserer Zeit **36** (March), 70–74 (2005).

24. Quantum gravity: General introduction and recent developments,
Annalen der Physik **15**, 129–148 (2006).

25. Quantum Cosmology,
e-Print: arXiv:0804.0672 [gr-qc]. To appear in *Beyond the Big Bang*, edited by R. Vaas (Springer, Berlin).
(with B. Sandhöfer)

26. Wege zu einer Vereinheitlichung von Gravitation und Quantentheorie,
Praxis der Naturwissenschaften – Physik in der Schule, Heft 6/58, 22–33 (2009).

27. Auf dem Weg zur Quantengravitation,
Spektrum der Wissenschaft, Heft 4/2012, 34–43. Also available in *Spektrum der Wissenschaft spezial* (Physik, Mathematik, Technik), Heft 1/13, 48–57 (2013).

28. Conceptual Problems in Quantum Gravity and Quantum Cosmology ,
ISRN Mathematical Physics, **2013**, article ID 509316 (2013).

29. Einsteins Suche nach der vereinheitlichten Feldtheorie,
Physik in unserer Zeit **46** (November), 274–280.

4. INVITED CONTRIBUTIONS TO BOOKS

30. Quantum gravitational effects in De Sitter space,
in: *New Frontiers in Gravitation*, edited by G. Sardanashvily (Hadronic Press, Palm Harbor, 1996), pp. 203–214.

31. *Lexikon der Physik* (Spektrum, Heidelberg, 1998ff.):
Entries on "Dekohärenz, Irreversibilität, Mixmaster-Kosmologie, Quantengravitation, Quantenkosmologie, Schwarze Löcher, Supergravitation, verschränkte Zustände, Vielweltentheorie, Wheeler-DeWitt-Gleichung, Wigners Freund, Zeitpfeil, Zustandsreduktion".

32. Path integrals in quantum cosmology,
in: *Fluctuating paths and fields*, edited by W. Janke, A. Pelster, H.-J. Schmidt, and M. Bachmann (World Scientific, Singapore, 2001), pp. 729–740.

33. Zeitpfeil,
in: *Der Brockhaus Naturwissenschaften und Technik* (Spektrum, Heidelberg, 2002), pp. 2220–2222.

34. On the interpretation of quantum theory – from Copenhagen to the present day,
in: *Time, Quantum and Information*, edited by L. Castell and O. Ischebeck (Springer, Berlin, 2003), pp. 291–299.

35. Quantengravitation,
in: *Faszination Physik*, edited by K.-Bammel (Elsevier GmbH, München, 2004), pp. 201–212.

36. Why quantum gravity?,
in: *Approaches to Fundamental Physics: An Assessment of Current Theoretical Ideas*, edited by E. Seiler and I.-O. Stamatescu (Springer, Berlin, 2007).

37. The canonical approach to quantum gravity: General ideas and geometrodynamics,
in: *Approaches to Fundamental Physics: An Assessment of Current Theoretical Ideas*, edited by E. Seiler and I.-O. Stamatescu (Springer, Berlin, 2007).
(with D. Giulini)

38. CPT theorem,
in: *Compendium of Quantum Physics*, edited by D. Greenberger, K. Hentschel, and F. Weinert (Springer, Berlin, 2009), pp. 138–139.

39. Quantum gravity (general) and applications,
in: *Compendium of Quantum Physics*, edited by D. Greenberger, K. Hentschel, and F. Weinert (Springer, Berlin, 2009), pp. 565–572.

40. Can the Arrow of Time be understood from Quantum Cosmology?
in: *The Arrows of Time*, edited by L. Mersini-Houghton and R. Vaas (Springer, Berlin, 2012), pp. 191–203.

41. Zur Geschichte der Astronomie und Physik in Köln,
in: *Entwicklung der Theoretischen Astrophysik*, edited by G. Wolfschmidt (Tredition, Hamburg, 2011), pp. 16–31.

42. Aktuelle Forschungsthemen der Gravitationsphysik,
in: *Entwicklung der Theoretischen Astrophysik*, edited by G. Wolfschmidt (Tredition, Hamburg, 2011), pp. 233–243.

43. Quantengravitation,
in: *Philosophie der Physik*, edited by M. Esfeld (Suhrkamp, Berlin, 2012), pp. 267–286.

44. Weizsäckers Zeitbegriff aus heutiger Sicht,
in: *Acta Historica Leopoldina* **63**, 177–186 (2014).

45. Quantum Gravity,
in: *Springer Handbook on Spacetime*, edited by A. Ashtekar and V. Petkov (Springer, Berlin, 2014), pp. 709–722.

46. Die Rolle der Zeit in der Kosmologie,
in: *Mensch und Zeit*, edited by G. Hartung (Springer VS, Wiesbaden, 2015), p. 25–33.

47. Ist die Natur unscharf? Die Rolle der Quantenphysik,
in: *Interdisziplinäres Plenum Unschärfe*, herausgegeben von der Nordrhein-Westfälischen Akademie der Wissenschaften und der Künste (Ferdinand Schöningh, Paderborn, 2016), p. 29–43.

48. Notes on semiclassical Weyl gravity,
in: *Gravity and the Quantum*, edited by J. Singh Bagla and S. Engineer (Springer, Berlin, 2017), pp. 127–143.
(with B. Nikolić)

5. REFEREED ARTICLES

49. Observation of the comet Stephan-Oterma (1980g) at the Observatory of Heidelberg,
Minor Planets Circular **5802**, March 1981.
(with U. Görze)

50. On the construction of the U-matrix from Dirac brackets,
Il Nuovo Cimento **83A**, 140–150 (1984).
(with K.D. Rothe)

51. Dirac-Bracket formulation of QED in the superaxial gauge: second order formulation,
Zeitschrift für Physik C **27**, 393–398 (1985).
(with K.D. Rothe)

52. Continuous measurement of minisuperspace variables by higher multipoles,
Classical and Quantum Gravity **4**, 1369–1382 (1987).

53. Wave packets in minisuperspace,
Physical Review D **38**, 1761–1772 (1988).

54. Continuous measurement of intrinsic time by fermions,
Classical and Quantum Gravity **6**, 561–566 (1989).

55. Non-minimally coupled scalar fields and the initial value problem in quantum gravity,
Physics Letters B **225**, 227–232 (1989).

56. Quantum gravity and Brownian motion,
Physics Letters A **139**, 201–203 (1989).
(selected for "honorable mention" by the *Gravity Research Foundation* 1989)

57. Wave packets in quantum cosmology and the cosmological constant,
Nuclear Physics B **341**, 273–293 (1990).

58. Self-energy of a thin charged shell in general relativity,
Physical Review D **42**, 4254–4256 (1990).
(with M. Heusler and N. Straumann)

59. On the meaning of path integrals in quantum cosmology,
Annals of Physics **207**, 53–70 (1991).

60. Interpretation of the decoherence functional in quantum cosmology,
Classical and Quantum Gravity **8**, 379–391 (1991).

61. Quantum gravitational corrections to the functional Schrödinger equation,
Physical Review D **44**, 1067–1076 (1991).
(with T.P. Singh)

62. A comparison between semiclassical gravity and semiclassical electrodynamics,
Classical and Quantum Gravity **8**, L185–L192 (1991).
(with T. Padmanabhan and T. P. Singh)

63. Functional Schrödinger equation for scalar QED,
Physical Review D **45**, 2044–2056 (1992).

64. Decoherence in quantum electrodynamics and quantum gravity,
Physical Review D **46**, 1658–1670 (1992).

65. Topology, decoherence, and semiclassical Gravity,
Physical Review D **47**, 5414–5421 (1993).

66. On time and the quantum-to-classical transition in Jordan-Brans-Dicke quantum gravity,
Classical and Quantum Gravity **10**, 2511–2518 (1993).
(with E. Martínez)

67. Functional Schrödinger equation for fermions in external gauge fields,
Annals of Physics **236**, 241–285 (1994).
(with A. Wipf)

68. Quantum gravity and non-unitarity in black hole evaporation,
Modern Physics Letters A **9**, 2661–2669 (1994).
(with R. Müller and T. P. Singh)

69. Wheeler-DeWitt metric and the attractivity of gravity,
Physics Letters A **193**, 21–24 (1994).
(with D. Giulini)

70. Arrow of time in a recollapsing quantum universe,
Physical Review D **51**, 4145–4153 (1995).
(with H. D. Zeh)

71. Consistency of semiclassical gravity,
Classical and Quantum Gravity **12**, 403–411 (1995).
(with D. Giulini)

72. Symmetries, superselection rules, and decoherence,
Physics Letters A **199**, 291–298 (1995).
(with D. Giulini and H. D. Zeh)

73. Decoherence of black holes by Hawking radiation,
Physical Review D **53**, 7050–7061 (1996).
(with J.-G. Demers)

74. Ehrenfest's principle and the problem of time in quantum gravity,
Nuclear Physics B **475**, 339–357 (1996).
(with T. Brotz)

75. Semiclassical black hole states and entropy,
Physical Review D **55**, 2186–2191 (1997).
(with T. Brotz)

76. Boundary conditions in quantum string cosmology,
Physics Letters B **397**, 185–192 (1997).
(with M. P. Dąbrowski)

77. Wheeler-DeWitt equation and Feynman diagrams,
Nuclear Physics B **526**, 509–539 (1998).
(with A.O. Barvinsky)

78. Quantum-to-classical transition for fluctuations in the early universe,
International Journal of Modern Physics D **7**, 455–462 (1998).
(with D. Polarski and A.A. Starobinsky)

79. Emergence of classicality for primordial fluctuations:
Concepts and analogies,
Annalen der Physik **7**, 137–158 (1998).
(with D. Polarski)

80. The coherence of primordial fluctuations produced during inflation,
Classical and Quantum Gravity **15**, L67–L72 (1998).
(with J. Lesgourgues, D. Polarski and A.A. Starobinsky)

81. Answer to Question #60. Interference of two independent sources,
American Journal of Physics **66**, 661–662 (1998).

82. Hamiltonian evolution and quantization for extremal black holes,
Annalen der Physik **8**, 67–81 (1999).
(with J. Louko)

83. Decoherence in quantum cosmology at the onset of inflation,
Nuclear Physics B **551**, 374–396 (1999).
(with A.O. Barvinsky, A.Yu. Kamenshchik, and I.V. Mishakov)

84. Effective action and decoherence by fermions in quantum cosmology,
Nuclear Physics B **552**, 420–444 (1999).
(with A.O. Barvinsky and A. Yu. Kamenshchik)

85. Origin of the inflationary Universe,
Modern Physics Letters A **14**, 1083–1088 (1999).
(with A.O. Barvinsky and A.Yu. Kamenshchik)
(selected for "honorable mention" by the *Gravity Research Foundation* 1999)

86. Entropy of gravitons produced in the early Universe,
Physical Review D **62**, 043518 (2000).
(with D. Polarski and A.A. Starobinsky)

87. Robustness and diffusion of pointer states,
Physical Review Letters **85**, 3552–3555 (2000).
(with L. Diósi)

88. Embedding variables in the canonical theory of gravitating shells,
Nuclear Physics B **603**, 531–554 (2001).
(with P. Hájíček)

89. Singularity avoidance by collapsing shells in quantum gravity,
International Journal of Modern Physics D **10**, 775–779 (2001).
(with P. Hájíček)
(selected for "honorable mention" by the *Gravity Research Foundation* 2001)

90. Hawking radiation from decoherence,
Classical and Quantum Gravity **18**, L151–154 (2001).

91. Primordial black holes from inflationary models with and without broken scale invariance,
Physical Review D **65**, 024008 (2002).
(with T. Bringmann and D. Polarski)

92. Exact positivity of the Wigner and P-functions of a Markovian open system,
Journal of Physics A **35**, 2675–2683 (2002).
(with L. Diósi)

93. Can primordial black holes be a significant part of dark matter?,
Physics Letters B **535**, 11–16 (2002).
(with D. Blais and D. Polarski)

94. Accurate results for primordial black holes from spectra with a distinguished scale,
Physical Review D **67**, 024024 (2003).
(with D. Blais, T. Bringmann, and D. Polarski)

95. Nonlocal braneworld action: an alternative to Kaluza-Klein description,
Physical Review D **67**, 023513 (2003).
(with A.O. Barvinsky, A.Yu. Kamenshchik, and A. Rathke)

96. Quantum general relativity and Hawking radiation,
Physical Review D **67**, 024014 (2003).
(with C. Vaz, T. P. Singh, and L. Witten)

97. Radion-induced graviton oscillations in the two-brane world,
Physics Letters B **571**, 229–234 (2003).
(with A.O. Barvinsky, A.Yu. Kamenshchik, and A. Rathke)

98. Radion-induced gravitational wave oscillations and their phenomenology,
Annalen der Physik **12**, 343–70 (2003).
(with A.O. Barvinsky, A.Yu. Kamenshchik, and A. Rathke)

99. Hawking temperature from quasi-normal modes,
Classical and Quantum Gravity **21**, L123–127 (2004).

100. Semiclassical approximation to supersymmetric quantum gravity,
Physical Review D **72**, 045006 (2005).
(with T. Lück and P. Moniz)

101. Classical and quantum LTB model for the non-marginal case,
Physical Review D **73**, 044025 (2006).
(with J. Müller-Hill and C. Vaz)

102. Quantum phantom cosmology,
Physical Review D **74**, 044022 (2006).
(with M. P. Dąbrowski and B. Sandhöfer)

103. Pointer states for primordial fluctuations in inflationary cosmology,
Classical and Quantum Gravity **24**, 1699–1718 (2007).
(with I. Lohmar, D. Polarski, and A. A. Starobinsky)

104. Effective action and heat kernel in a toy model of brane-induced gravity,
Physical Review D **75**, 044010 (2007).
(with A. O. Barvinsky, A. Yu. Kamenshchik, and D. V. Nesterov)

105. Hawking radiation from the quantum Lemaître-Tolman-Bondi model,
Physical Review D **75**, 124010 (2007).
(with J. Müller-Hill, T. P. Singh, and C. Vaz)

106. Quantum cosmology with a big-brake singularity,
Physical Review D **76**, 064032 (2007).
(with A. Y. Kamenshchik and B. Sandhöfer)

107. Quantum gravitational collapse and Hawking radiation in 2+1 dimensions, *Physical Review D* **76**, 124021 (2007).
(with C. Vaz, S. Gutti, and T. P. Singh)

108. Mass spectrum and statistical entropy of the BTZ black hole from canonical quantum gravity,
Physical Review D **77**, 064021 (2008).
(with C. Vaz, S. Gutti, T. P. Singh, and L. C. R. Wijewardhana)

109. Gibbs' paradox and black-hole entropy,
General Relativity and Gravitation **40**, 1327–1339 (2008).
(with G. Kolland)

110. Measurement analysis and quantum gravity,
Physical Review D **78**, 064051 (2008).
(with M. Albers and M. Reginatto)

111. Quantum geometrodynamics: whence, whither?,
General Relativity and Gravitation **41**, 877–901 (2009).

112. Asymptotic freedom in inflationary cosmology with a non-minimally coupled Higgs field,
Journal of Cosmology and Astroparticle Physics 12 (2009) 003.
(with A. O. Barvinsky, A. Yu. Kamenshchik, A. A. Starobinsky, and C. Steinwachs)

113. On the quantum fate of singularities in a dark-energy dominated universe,
Physical Review D **79**, 124035 (2009).
(with M. Bouhmadi-López, B. Sandhöfer, and P. Vargas Moniz)

114. Why do cosmological perturbations look classical to us?
Advanced Science Letters **2**, 164–173 (2009).
(with D. Polarski)

115. Indefinite oscillators and black-hole evaporation,
Annalen der Physik **18**, 722–735 (2009).
(with J. Marto and P. V. Moniz)

116. Quantum gravitational collapse in the Lemaître–Tolman–Bondi model with a positive cosmological constant,
Classical and Quantum Gravity **27**, 015011 (12pp) (2010).
(with A. Franzen and S. Gutti)

117. Tunneling cosmological state revisited: Origin of inflation with a non-minimally coupled Standard Model Higgs inflaton,
Physical Review D **81**, 043530 (2010).
(with A. O. Barvinsky, A. Yu. Kamenshchik, and C. Steinwachs)

118. Can quantum theory be applied to the Universe as a whole?,
Foundations of Physics **40**, 1410–1418 (2010).

119. Quantum gravitational correction to the Hawking temperature from the Lemaître–Tolman–Bondi model,
Physical Review D **82**, 044013 (2010).
(with R. Banerjee and B. R. Majhi)

120. Cosmological constant from decoherence,
Classical and Quantum Gravity **28**, 125022 (2011).
(with F. Queisser and A. A. Starobinsky)

121. Quantum gravitational contributions to the CMB anisotropy spectrum,
Physical Review Letters **108**, 021301 (2012).
(with M. Krämer)

122. Can effects of quantum gravity be observed in the cosmic microwave background?,
International Journal of Modern Physics D **21**, 1241001 (2012). Essay

awarded first prize in the Gravity Research Foundation essay competition 2012.
(with M. Krämer)

123. Higgs boson, renormalization group, and naturalness in cosmology,
European Physical Journal C **72**, 2219 (2012).
(with A. O. Barvinsky, A. Yu. Kamenshchik, A. A. Starobinsky, and C. Steinwachs)

124. Interpretation of the triad orientations in loop quantum cosmology,
Classical and Quantum Gravity **30**, 035008 (2013).
(with C. Schell)

125. On the modification of the cosmic microwave background anisotropy spectrum from canonical quantum gravity,
Physical Review D **87**, 104008 (2013).
(with D. Bini, G. Esposito, M. Krämer, and F. Pessina)

126. Resolution of type IV singularities in quantum cosmology ,
Physical Review D **89**, 064016 (2014).
(with M. Bouhmadi-López and M. Krämer)

127. Quantum cosmological consistency condition for inflation,
Journal of Cosmology and Astroparticle Physics 10 (2014) 026.
(with G. Calcagni and C. F. Steinwachs)

128. Scalar perturbations in cosmological models with dark energy - dark matter interaction,
Journal of Cosmology and Astroparticle Physics 07 (2015) 036.
(with M. Eingorn)

129. Quantum-gravitational effects on gauge-invariant scalar and tensor perturbations during inflation: the de Sitter case,
Physical Review D **93**, 104035 (2016).
(with D. Brizuela and M. Krämer)

130. Classical and quantum cosmology of Born-Infeld type models,
Physical Review D **93**, 083519 (2016).
(with A. Kamenshchik and N. Kwidzinski)

131. Classical and quantum cosmology of the little rip abrupt event,
Physical Review D **94**, 063536 (2016).
(with I. Albarran, M. Bouhmadi-López, J. Marto, and P. Vargas Moniz)

132. Scalar and vector perturbations in a universe with discrete and continuous matter sources,
Journal of Cosmology and Astroparticle Physics 09 (2016) 032.
(with M. Eingorn and A. Zhuk)

133. Quantum-gravitational effects on gauge-invariant scalar and tensor perturbations during inflation: The slow-roll approximation,
Physical Review D **94**, 123527 (2016).
(with D. Brizuela and M. Krämer)

134. Conformal and Weyl-Einstein gravity: Classical geometrodynamics,
Physical Review D **95**, 084018 (2017).
(with B. Nikolić)

135. Thermal and nonthermal scaling of the Casimir-Polder interaction in a black hole spacetime,
Physical Review D **95**, 085014 (2017).
(with G. Menezes and J. Marino)

136. The Milky Way's Supermassive Black Hole: How good a case is it? A Challenge for Astrophysics and Philosophy of Science,
Foundations of Physics **47**, 553–624 (2017).
(with A. Eckart, A. Hüttemann, S. Britzen, C. Lämmerzahl, M. Zajaček, M. Stöckler, M. Valencia-S, V. Karas, and M. García-Marín)

137. Cosmic screening of the gravitational interaction,
International Journal of Modern Physics D **26**, 1743012 (2017).
(with M. Eingorn and A. Zhuk)
(selected for "honorable mention" by the *Gravity Research Foundation* 2017)

138. Comparison of the DeWitt metric in general relativity with the fourth-rank constitutive tensors in electrodynamics and in elasticity theory,
General Relativity and Gravitation **50**, 8 (2018).
(with F. W. Hehl)

139. Semiclassical approximation of the Wheeler-DeWitt equation: arbitrary orders and the question of unitarity,
General Relativity and Gravitation **50**, 66 (2018).
(with D. Wichmann)

140. On the dynamics of the general Bianchi IX spacetime near the singularity, arXiv:1807.06261 [gr-qc].
(with N. Kwidzinski and W. Piechocki)

6. CONTRIBUTIONS TO PROCEEDINGS

141. Der Zeitbegriff in der Quantengravitation,
Philosophia naturalis **27**, 43–65 (1990).

142. Zum Zeitbegriff der modernen Physik,
in: *Zürcher Hochschulforum Band 19*, edited by Ch. Thomas (Verlag der Fachvereine, Zürich, 1991), pp. 39–41.

143. How does quantum gravity modify the Schrödinger equation for matter fields?,
in: *Proceedings of Les Journées Relativistes 1991*, *Classical and Quantum Gravity* **9**, S147–S156 (1992).

144. Path integrals and boundary conditions in quantum cosmology,
in: *Proceedings of the Sixth Marcel Grossmann meeting on general relativity*, edited by H. Sato and T. Nakamura (World Scientific, Singapore, 1992), pp. 572–575.

145. Decoherence in quantum cosmology,
in: *Relativistic Astrophysics and Cosmology*, edited by S. Gottlöber, J. P. Mücket, and V. Müller (World Scientific, Singapore, 1992), pp. 227–234.

146. Path integrals and wormholes in quantum gravity,
in: *Proceedings of Les Journées Relativistes 1992*, *Classical and Quantum Gravity* **10**, S233–S234 (1993).

147. Emergence of classical spacetime,
in: *Classical and Quantum Gravity*, edited by M. Bento, O. Bertolami, J. Mourão, and R. Picken (World Scientific, Singapore, 1993,) pp. 308–315.

148. Quantum cosmology and the emergence of a classical world,
in: *Philosophy, Mathematics and Modern Physics*, edited by E. Rudolph and I.-O. Stamatescu (Springer, Berlin, 1994), pp. 104–119.

149. Semiclassical gravity and the problem of time,
in: *Proceedings of the Cornelius Lanczos International Centenary Conference*, edited by J. D. Brown, M. T. Chu, D. T. Ellison, and R. J. Plammons (SIAM, Philadelphia, 1994) pp. 566–569.

150. Probleme der Quantengravitation,
Philosophia naturalis **31**, 309–327 (1994).

151. Irreversibility in quantum field theory,
in: *Nonlinear, dissipative, irreversible quantum systems*, edited by H.-D. Doebner, V. K. Dobrev, and P. Nattermann (World Scientific, Singapore, 1995), pp. 91–97.

152. Über den Ursprung der physikalischen Zeitrichtung im Universum,
in: *Die Natur ist unser Modell von ihr*, edited by V. Braitenberg and I. Hosp (Rowohlt, Reinbek, 1996), pp. 169–189.

153. Time and quantum cosmology,
in: *Fundamentos de Física Cuántica*, edited by M. Ferrero, A.F. Rañada, J.L. Sánchez Gómez and E. Santos (Editorial Complutense, Madrid, 1997), pp. 259–274.

154. What can fundamental theories say about the origin of the Universe?
in: *The Evolution of the Universe*, edited by G. Börner and S. Gottlöber (John Wiley& Sons, Chichester, 1997), pp. 97–112.

155. Are we making progress in relating cosmology and fundamental theories?,
in: *The Evolution of the Universe*, edited by G. Börner and S. Gottlöber (J. Wiley & Sons, Chichester, 1997), pp. 141–156.
(with J. Frieman, R. Brandenberger, V. Müller, V. Mukhanov, K. Sato, P. Steinhardt, A. Starobinsky, N. Straumann, and A. Wipf)

156. Vom Quantenuniversum zur klassischen Welt,
in: *Die Erfindung des Universums?*, edited by W. Saltzer, P. Eisenhardt, D. Kurth, and R.E. Zimmermann (Insel, Frankfurt am Main, 1997), pp. 97–108.

157. Does time exist at the most fundamental level?,
in: *Time, Temporality, Now*, edited by H. Atmanspacher and E. Ruhnau (Springer, Berlin, 1997), pp. 227–240.

158. Semiclassical quantum states for black holes,
in: *Nuclear Physics B* (Proceedings Supplement) **57**, 173–176 (1997).

159. Wigner function and decoherence,
in: *Proceedings of the 5th Wigner Symposium*, edited by P. Kasperkovitz and D. Grau (World Scientific, Singapore, 1998), pp. 521–523.

160. Decoherence in situations involving the gravitational field,
in: *Decoherence: Theoretical, experimental and conceptual problems*,

edited by P. Blanchard, D. Giulini, E. Joos, C. Kiefer, and I.-O. Stamatescu (Springer, Berlin, 2000), pp. 101–112.

161. Origin of classical structure from inflation,
Nuclear Physics B (Proceedings Supplement) **88**, 255–258 (2000).

162. Entropy of gravitational waves and primordial fluctuations,
in: *Cosmology and particle physics*, edited by J. Garcia-Bellido, R. Durrer, and M. Shaposhnikov (American Institute of Physics, New York, 2001), pp. 499–504.

163. Decoherence and ultraviolet divergences in quantum cosmology,
in: *Quantization, gauge theory, and strings, Vol. II*, Proceedings of the International Conference dedicated to the memory of Professor Efim Fradkin, edited by A. Semikhatov, M. Vasiliev, and V. Zaikin (Scientific World, Moscow, 2001), pp. 427–435.
(with A.O. Barvinsky and A.Yu. Kamenshchik)

164. Quantum aspects of black holes,
in: *The galactic black hole*, edited by H. Falcke and F.W. Hehl (IOP Publishing, Bristol, 2003), pp. 207–225.

165. Phase transitions, massive gravitons and effective action in braneworld theory,
in: *Proceedings of the Third Sakharov meeting, Vol. II*, Moscow 2002, edited by A. Semikhatov, M. Vasiliev, and V. Zaikin (Scientific World, Moscow, 2003), pp. 702–713.
(with A.O. Barvinsky, A.Yu. Kamenshchik, and A. Rathke)

166. Gravitational-wave oscillations in the Randall-Sundrum model,
in: *Proceedings of the Third Sakharov meeting, Vol. II*, Moscow 2002, edited by A. Semikhatov, M. Vasiliev, and V. Zaikin (Scientific World, Moscow, 2003), pp. 757–766.
(with A.O. Barvinsky, A.Yu. Kamenshchik, and A. Rathke)

167. Determinism in classical and quantum gravity,
in: *Determinism in physics and biology*, edited by A. Hüttemann (Mentis, Paderborn, 2003), pp. 38–49.

168. Quantum gravity – A general introduction,
in: *Quantum Gravity: From Theory to Experimental Search*, edited by D. Giulini, C. Kiefer, and C. Lämmerzahl (Springer, Berlin, 2003), pp. 3–13.

169. Is there an information-loss problem for black holes?,
in: *Decoherence and Entropy in Complex Systems*, edited by H.-T. Elze (Springer, Berlin, 2004), pp. 84–95.

170. The relevance of gravity for DICE,
in: *Decoherence and Entropy in Complex Systems*, edited by H.-T. Elze (Springer, Berlin, 2004), pp. 9–14.

171. Will LIGO see RIGO's? – Radion-induced graviton oscillations in the two-brane world,
in: *Proceedings of the International Conference 'SUGRA 20'*, edited by P. Nath (Rinton Press, Princeton, 2004), pp. 517–521.
(with A.O. Barvinsky, A.Yu. Kamenshchik, and A. Rathke)

172. Quantum gravity and fundamental constants,
in: *Astrophysics, clocks, and fundamental constants*, edited by S. Karshenboim and E. Peik (Springer, Berlin, 2004), pp. 115–127.

173. Quantum cosmology and the arrow of time,
Brazilian Journal of Physics **35**, 296–299 (2005).

174. A mission to explore the Pioneer anomaly,
ESA Spec. Publ. **588**, 3–10 (2005).
(with H. Dittus and 37 other authors [PIONEER collaboration])

175. Quantum cosmology: expectations and results,
Annalen der Physik **15**, 316–325 (2006).

176. Arrow of time from timeless quantum gravity,
in: *Time and matter*, edited by I. I. Bigi and M. Faessler (World Scientific, Singapore, 2006), pp. 225–234.

177. Quantum gravity — A short overview,
in: *Quantum Gravity*, edited by B. Fauser, J. Tolksdorf, and E. Zeidler (Birkhäuser, Basel, 2006), pp. 1–13.

178. Relational aspects of space and time in general relativity and quantum gravity,
Zeitsprünge **11**, 190–202 (2007).

179. Origin of classical structure in the Universe,
Journal of Physics: Conference Series **67**, 012023 (2007).
(with I. Lohmar, D. Polarski, and A. A. Starobinsky)

180. Conceptual issues in canonical quantum gravity and cosmology,
in: *Proceedings of the second conference on time and matter*, edited by M. O'Loughlin, S. Stanič, and D. Veberič (University of Nova Gorica Press, Nova Gorica, 2008), pp. 131–143.

181. Wege zu einer Vereinheitlichung von Gravitation und Quantentheorie,
Nordrhein-Westflische Akademie der Wissenschaften, Abteilung Naturwissenschaften und Medizin, Vorträge N 473 (Ferdinand Schöningh, Paderborn, 2008).

182. Semiclassical supersymmetric quantum gravity,
in: *The Eleventh Marcel Grossmann Meeting*, edited by H. Kleinert, R. T. Jantzen, and R. Ruffini (World Scientific, Singapore, 2008), pp. 1920–1924.
(with T. Lück and P. V. Moniz)

183. Path integrals in quantum gravity: general concepts and recent developments,
in: *Path Integrals: New Trends and Perspectives*, edited by W. Janke and A. Pelster (World Scientific, Singapore, 2008), pp. 181–190.

184. Quantum gravity and the arrow of time,
in: *Time, Chance and Reduction*, edited by G. Ernst and A. Hüttemann (Cambridge University Press, Cambridge, 2010), pp. 59–67.

185. Can singularities be avoided in quantum cosmology?
Annalen der Physik **19**, 211–218 (2010).

186. On the avoidance of classical singularities in quantum cosmology,
Journal of Physics Conference Series **222**, 012049 (2010).

187. Defrosting the Big Freeze quantum mechanically?,
in: *Proceedings of the Twelfth Marcel Grossmann Meeting on General Relativity*, edited by T. Damour, T. T. Jantzen, and R. Ruffini (World Scientific, Singapore, 2012), pp. 1444–1446.
(with M. Bouhmadi-López, B. Sandhöfer, and P. V. Moniz)

188. Quantum cosmology for the 21st century: A debate,
in: *Proceedings of the Twelfth Marcel Grossmann Meeting on General Relativity*, edited by T. Damour, T. T. Jantzen, and R. Ruffini (World Scientific, Singapore, 2012), pp. 589–608.
(with M. Bojowald and P. V. Moniz)

189. The Higgs field as an inflaton,
in: *Proceedings of the Twelfth Marcel Grossmann Meeting on General Relativity*, edited by T. Damour, T. T. Jantzen, and R. Ruffini (World Scientific, Singapore, 2012), pp. 1244–1246.
(with C. F. Steinwachs, A. O. Barvinsky, A. Yu. Kamenshchik, and A. A. Starobinsky)

190. Asymptotic freedom in inflationary cosmology with a non-minimally coupled Higgs field,
in: *Proceedings of the Twelfth Marcel Grossmann Meeting on General Relativity*, edited by T. Damour, T. T. Jantzen, and R. Ruffini (World Scientific, Singapore, 2012), pp. 1429–1431.
(with C. F. Steinwachs, A. O. Barvinsky, A. Yu. Kamenshchik, and A. A. Starobinsky)

191. Cosmological constant from decoherence?,
in: *Proceedings of the Twelfth Marcel Grossmann Meeting on General Relativity*, edited by T. Damour, T. T. Jantzen, and R. Ruffini (World Scientific, Singapore, 2012), pp. 1305–1307.
(with F. S. Queisser and A. A. Starobinsky)

192. Quantum gravity: whence, whither?,
in: *Quantum Field Theory and Gravity*, edited by F. Finster, O. Müller, M. Nardmann, J. Tolksdorf, and E. Zeidler (Birkhäuser, Basel, 2012), pp. 1–13.

193. The semiclassical approximation to quantum gravity and its observational consequences,
Journal of Physics Conference Series **442**, 012025 (2013).

194. On the concept of law in physics,
European Review **22**, S26–S32 (2014).

195. On the Observability of Quantum-Gravitational Effects in the Cosmic Microwave Background,
Springer Proceedings in Physics, **157**, 531–538 (2014).
(with M. Krämer)

196. What can quantum cosmology say about the inflationary universe?,
Journal of Physics Conference Series **626**, 012003 (2015).
(with G. Calcagni and C. Steinwachs)

197. Quantum black hole without singularity,
in: *The Fourteenth Marcel Grossmann Meeting* , edited by M. Bianchi,

R. T. Jantzen, and R. Ruffini (World Scientific, Singapore, 2018), pp. 1685–1689.

198. Quantum geometrodynamics of Einstein and conformal (Weyl-squared) gravity,
Journal of Physics Conference Series **880**, 012002 (2017).
(with B. Nikolić)

7. BOOK REVIEWS

199. H.-H. von Borzeszkowski and H.-J. Treder, The Meaning of Quantum Gravity (Reidel, Dordrecht, 1987),
in: *Physikalische Blätter* **44**, 408 (1988).

200. J. Audretsch and K. Mainzer (Eds.), Philosophie und Physik der Raum-Zeit (Bibliographisches Institut, Mannheim, 1988),
in: *Physikalische Blätter* **45**, 387 (1989).

201. J.V. Narlikar and T. Padmanabhan, Gravity, Gauge Theories and Quantum Cosmology (Kluwer, Dordrecht, 1987),
in: *General Relativity and Gravitation* **22**, 833–835 (1990).

202. H.S. Kragh, Dirac: A Scientific Biography (Cambridge University Press, Cambridge, 1990),
in: *Physikalische Blätter* **47**, 146 (1991).

203. P.C.W. Davies and J.R. Brown, Der Geist im Atom (Birkhäuser, Basel, 1988),
in: *Gesnerus* **48**, 137–139 (1991).

204. K. Hentschel, Interpretationen und Fehlinterpretationen der speziellen und der allgemeinen Relativitätstheorie durch Zeitgenossen Albert Einsteins (Birkhäuser, Basel, 1990),
in: *Gesnerus* **49**, 99–101 (1992).

205. T. Fließbach, Allgemeine Relativitätstheorie (Bibliographisches Institut, Mannheim, 1990),
in: *Physik in unserer Zeit* **23**, 45 (1992).

206. K.M. Olesko, Physics as a calling (Cornell University Press 1991),
in: *Gesnerus* **49**, 421–422 (1992).

207. A. Hermann, Weltreich der Physik (Verlag für Geschichte der Naturwissenschaften und Technik, Stuttgart, 1991),
in: *Gesnerus* **50**, 297–298 (1993).

208. S. Coleman et al. (Ed.), Quantum Cosmology and Baby Universes (World Scientific, Singapore, 1991),
in: *Mathematical Reviews*, August 1993, pp. 4617–4618.

209. G. Lind, Physik im Lehrbuch 1700–1850 (Springer, Berlin, 1992),
in: *Gesnerus* **50**, 298–299 (1993).

210. Physical Origins of Time Asymmetry, edited by J. J. Halliwell, J. Pérez-Mercader, and W. H. Zurek (Cambridge University Press, Cambridge, 1994),
in: *Physikalische Blätter* **51**, 970 (1995).

211. M. White and J. Gribbin, Stephen Hawking. Die Biographie (Rowohlt, Reinbek, 1994),
in: *Spektrum der Wissenschaft*, August 1995, p. 108.

212. S.W. Hawking and R. Penrose, The Nature of Space and Time (Princeton University Press, Princeton, 1996),
in: *Physik in unserer Zeit* **27**, XII (1996).

213. H. Price, Time's Arrow and Archimedes' Point (Oxford University Press, Oxford, 1996),
in: *Physics World* **9** (Dec. 1996), pp. 46–47.

214. H. Genz, Wie die Zeit in die Welt kam (Hanser, München, 1996),
in: *Physikalische Blätter* **53**, 456 (1997).

215. J. Horgan, An den Grenzen des Wissens (Luchterhand, München 1997),
in: *Physik in unserer Zeit* **29**, 42 (1998).

216. L.S. Schulman, Time's Arrows and Quantum Measurement (Cambridge University Press, Cambridge, 1997),
in: *Physikalische Blätter* **54**, 841 (1998).

217. H. Collins und T. Pinch, *Der Golem der Forschung* (Berlin-Verlag, Berlin, 1999),
in: *Physikalische Blätter* **56** (No. 7/8), 113 (2000).

218. S. Roy, Statistical geometry and applications to microphysics and cosmology (Kluwer, Dordrecht, 1998),
in: *General Relativity and Gravitation* **32**, 963–965 (2000).

219. J. Al-Khalili, *Black holes, wormholes and time machines* (IOP, Bristol, 1999),
in: *Physikalische Blätter* **56** (No. 11), 73–74 (2000).

220. J. Butterfield (Ed.), *The arguments of time* (Oxford University Press, Oxford, 1999),
in: *Erkenntnis* **54**, 407–411 (2001).

221. B. Suchan, *Die Stabilität der Welt* (mentis, Paderborn, 1999),
in: *Physikalische Blätter* **57** (No. 9), 67–68 (2001).

222. J. Schwinger, *Quantum mechanics* (Springer, Heidelberg, 2001),
in: *Physik in unserer Zeit* **33**, 90 (2002).

223. P. Gondhalekar, *The grip of gravity* (Cambridge University Press, Cambridge, 2001),
in: *Physik-Journal* **2** (Nr. 4), 57–58 (2003).

224. T. Filk and D. Giulini, *Am Anfang war die Ewigkeit* (C. H. Beck, München, 2004),
in: *Physik-Journal* **4** (Nr. 6), 62 (2005).

225. C. Rovelli, *Quantum gravity* (Cambridge University Press, Cambridge, 2004),
in: *Classical and Quantum Gravity* **22**, 4386–4387 (2005).

226. G. W. Gibbons, E. P. S. Shellard, and S. J. Rankin (eds), *The future of theoretical physics and cosmology. Celebrating Stephen Hawking's 60th Birthday* (Cambridge University Press, Cambridge, 2003),
in: *General Relativity and Gravitation* **38**, 699–701 (2006).

227. D. Wuensch, *Der Erfinder der 5. Dimension – Theodor Kaluza. Leben und Werk* (Termessos-Verlag, Göttingen, 2007),
in: *Physik in unserer Zeit* **38**, 255–256 (2007).

228. M. Schlosshauer, *Decoherence and the quantum-to-classical transition* (Springer, Berlin, 2007),
in: *Physik-Journal* **7**, 128 (2008).

229. M. Bojowald, *Zurück vor den Urknall* (S. Fischer, Frankfurt am Main 2009),
in: *Physik in unserer Zeit* **40**, 263–264 (2009).

230. D. Oriti (ed.), *Approaches to Quantum Gravity* (Cambridge University Press, Cambridge, 2009),
in: *Classical and Quantum Gravity* **27**, 019002 (1p) (2010).

231. S. Carroll, *From Eternity to Here: The Quest for the Ultimate Theory of Time* (Dutton 2010),
in: *Nature Physics* **6**, 398–399 (2010).

232. A. Unzicker, *Vom Urknall zum Durchknall* (Springer, Berlin, 2010),
in: *Physik-Journal* **9**, 51 (2010).

233. H. M. Wiseman and G. J. Milburn, *Quantum Measurement and Control* (Cambridge University Press, Cambridge, 2010),
in: *Classical and Quantum Gravity* **27**, 249002 (2010).

234. T. Padmanabhan, *Gravitation, Foundations and Frontiers* (Cambridge University Press, Cambridge, 2010),
in: *General Relativity and Gravitation* **43**, 927–928 (2011).

235. P. Byrne, *Viele Welten: Hugh Everett III* (Springer, Berlin, 2012),
in: *Physik in unserer Zeit* **44**, 99 (2013).

236. P. Ferreira, *Die perfekte Theorie* (Verlag C. H. Beck, München, 2014),
in: *Frankfurter Allgemeine Zeitung*, 6. Juni 2014, p. 10.

237. M. Tegmark, *Unser mathematisches Universum* (Ullstein Verlag, Berlin),
in: *Frankfurter Allgemeine Zeitung*, 15. April 2015, p. 10.

238. B. Clegg, *Eine kleine Geschichte der Unendlichkeit* (Rowohlt Verlag, Reinbek, 2015),
in: *Frankfurter Allgemeine Zeitung*, 17. Juni 2015, p. 10.

239. N. Straumann, *Theoretische Mechanik* (Springer Spektrum, Heidelberg, 2015),
in: *Physik in unserer Zeit* **46**, 255 (2015).

240. M. Parker, *Auch Zahlen haben Gefühle* (Rowohlt, Reinbek, 2015),
in: *Frankfurter Allgemeine Zeitung*, 13. Mai 2016, p. 10.

241. R. Penrose, *Fashion, Faith, and Fantasy in the New Physics of the Universe* (Princeton University Press, Princeton, 2016),
in: *Frankfurter Allgemeine Zeitung*, 7. Oktober 2016, p. 12.

242. G. Farmelo, *Der seltsamste Mensch* (Springer, Heidelberg, 2016),
in: *Frankfurter Allgemeine Zeitung*, 26. November 2016, p. L14.

243. C. Rovelli, *Die Wirklichkeit, die nicht so ist, wie sie scheint* (Rowohlt-Verlag, Reinbek, 2016),
in: *Frankfurter Allgemeine Zeitung*, 28. Januar 2017, p. 10.

244. R. A. Muller, *Jetzt* (S. Fischer, Frankfurt am Main, 2018), in: *Frankfurter Allgemeine Zeitung*, 24. Juli 2018, p. 10.

8. TRANSLATIONS INTO GERMAN

245. J. Schwinger, *Einsteins Erbe* (Spektrum, Heidelberg, 1987).

246. J.A. Wheeler, *Gravitation und Raumzeit* (Spektrum, Heidelberg, 1991).

247. S.W. Hawking and R. Penrose, *Raum und Zeit* (Rowohlt, Reinbek, 1998).

9. MISCELLANEOUS

248. Interview with the *Süddeutsche Zeitung* on the concept of time in physics,
SZ-Magazin, 23.10.1998.

249. Wie schnell fällt Gravitationsenergie?,
Physikalische Blätter **56**, 14–16 (2000).

250. Breitet sich die Gravitation mit Lichtgeschwindigkeit aus?,
Physik-Journal **2** (Nr. 3), 23–24 (2003).
(with C. Lämmerzahl)

251. Die vierdimensionale Welt,
Physik in unserer Zeit **36** (January), 10–11 (2005).

252. Artikel zum Einsteinjahr in den
Stuttgarter Nachrichten vom 15.1.2005

253. Was ist das Wirkliche?,
in: *Der Einstein-Komplex*, edited by G. Weiberg and F. Berberich (Wunderhorn, Heidelberg, 2005), p. 70.

254. Does time exist in quantum gravity?
e-Print: arXiv:0909.3767 [gr-qc].
Essay awarded second prize in the FQXi essay competition on "The

Nature of Time". Published, with modifications, in: *Zagadnienia Filozoficzne w Nauce* **LIX**, 7–24 (2015), and in: *Towards a theory of spacetime theories*, edited by D. Lehmkuhl, G. Schiemann, and E. Scholz (Birkhäuser, Boston, 2017), p. 287–295.

255. Supervisor's Foreword,
in: C. F. Steinwachs, *Non-minimal Higgs inflation and frame dependence in cosmology* (Springer, Heidelberg, 2014), pp. vii–viii.

256. Gibt es die Zeit wirklich? Die Sichtweise der modernen Physik.
In: *Earnest & Algernon* **9**, 30–34 (2014).

257. Interview with Thomas Bührke, in:
T. Bührke, *Einsteins Jahrhundertwerk* (Deutscher Taschenbuch Verlag, München, 2015), pp. 226–231.

258. Als Raum und Zeit sich plötzlich krümmten,
Frankfurter Allgemeine Zeitung, 18. 11. 2015, p. N2.

259. Die Lehre von der Leere,
Physik in unserer Zeit **48**, 55 (2017).

260. The Birth of an Idea,
Entry on https://birthofidea.tecnico.ulisboa.pt/

261. Various reviews for *Mathematical Reviews*, see
http://www.ams.org/mathscinet/

last update: 24 July 2018