

**Selected 76 peer reviewed publications
(out of 155 total publications)**

In the areas of:

- Condensed matter and quantum magnetism
 - Excitable media
- Dynamics and structure of physiological systems
 - Financial, economic and social systems
 - Networks of dynamical systems
- Stochastic processes and methods of non-linear analysis

1. Ivanov NB and Ivanov PCh.

Frustrated two-dimensional quantum Heisenberg antiferromagnet at low temperatures.

Physical Review B 1992;46:8206-8213.

2. Makse HA, Davies GW, Havlin S, Ivanov PCh, King P, Stanley HE.

Long-range correlations in permeability fluctuations in porous rock.

Physical Review E 1996;54:3129–3134.

3. Ivanov PCh, Rosenblum MG, Peng C-K, Mietus J, Havlin S, Stanley HE, Goldberger AL.

Scaling behaviour of heartbeat intervals obtained by wavelet-based time-series analysis.

Nature 1996;383:323–327.

4. Ivanov PCh, Rosenblum MG, Peng C-K, Mietus J, Havlin S, Stanley HE, Goldberger AL.

Scaling and universality in heart rate variability distributions.

Physica A 1998; 249: 587–593.

5. Ivanov PCh, Amaral LAN, Goldberger AL, Stanley HE.

Stochastic feedback and the regulation of biological rhythms.

Europhysics Letters 1998;43:363–368.

6. Amaral LAN, Goldberger AL, Ivanov PCh, Stanley HE.

Scale-independent measures and pathologic cardiac dynamics.

Physical Review Letters 1998;81:2388–2391.

7. Ivanov PCh, Amaral LAN, Goldberger AL, Havlin S, Rosenblum MG, Struzik ZR, Stanley HE.

Multifractality in human heartbeat dynamics.

Nature 1999;399:461–465.

8. Stanley HE, Amaral LAN, Goldberger AL, Havlin S, Ivanov PCh, Peng C-K.

Statistical physics in physiology: monofractal and multifractal approaches.

Physica A 1999;270:309-324.

9. Ivanov PCh, Bunde A, Amaral LAN, Havlin S, Fritsch-Yelle J, R.M. Baevsky, Stanley HE, Goldberger AL.

Sleep-wake differences in scaling behavior of the human heartbeat: analysis of terrestrial and long-term space flight data.

Europhysics Letters 1999;48:594-600.

10. Havlin S, Buldyrev SV, Bunde A, Goldberger AL, Ivanov PCh, Peng C-K, Stanley HE.

Scaling in nature: from DNA through heartbeats to weather.

Physica A 1999;273:46-69.

11. Havlin S, Amaral LAN, Ashkenazy Y, Goldberger AL, Ivanov PCh, Peng C-K, Stanley HE.

Application of statistical physics to heartbeat diagnosis.

Physica A 1999;274:99-110.

12. Stanley HE, Amaral LAN, Gopikrishnan P, Ivanov PCh, Keitt TH, Plerou V.

Scale invariance and universality: organizing principles in complex systems.

Physica A 2000;281:60-68.

13. Goldberger AL, Amaral LAN, Glass L, Hausdorff JM, Ivanov PCh, Mark RG, Mietus JE, Moody GB, Peng C-K, Stanley HE.

PhysioBank, PhysioToolkit, and PhysioNet: components of a new research resource for complex physiologic signals.

Circulation 2000;101:e215.

14. Podobnik B, Ivanov PCh, Lee Y, Chessa A, Stanley HE.

Systems with correlations in the variance: generating power-law tails in probability distributions.

Europhysics Letters 2000;50(6):711-717.

15. Ashkenazy Y, Ivanov PCh, Havlin S, Peng C-K, Goldberger AL, Stanley HE.

Magnitude and sign correlations in heartbeat fluctuations.

Physical Review Letters 2001;86(9):1900-1903.

16. Hu K, Ivanov PCh, Chen Z, Carpena P, Stanley HE.

Effect of trends on detrended fluctuation analysis.

Physical Review E 2001;64(1):011114(19).

17. Amaral LAN, Ivanov PCh, Aoyagi N, Hidaka I, Tomono S, Goldberger AL, Stanley HE, Yamamoto Y.

Behavioral-independent features of complex heartbeat dynamics.

Physical Review Letters 2001;86(26):6026-6029.

18. Ivanov PCh, Podobnik B, Lee Y, and Stanley HE,

Truncated Levy process with scale-invariant behavior

Physica A 2001;299(1-2):154-160.

19. Schulte-Frohlinde V, Ashkenazy Y, Ivanov PCh, Glass L, Goldberger AL, Stanley HE.

Noise effects on the complex patterns of abnormal heartbeats.

Physical Review Letters 2001;87(6):068104(4).

20. Ivanov PCh, Amaral LAN, Goldberger AL, Havlin S, Rosenblum MG, Stanley HE, Struzik Z,

From $1/f$ Noise to Multifractal Cascades in Heartbeat Dynamics.

Chaos 2001;11(3):641-652.

21. Bernaola-Galvan P, Ivanov PCh, Amaral LAN, Stanley HE.

Scale Invariance in the Nonstationarity of Human Heart Rate.

Physical Review Letters 2001;87(16):168105(4).

22. Hausdorff JM, Ashkenazy Y, Peng C-K, Ivanov PCh, Stanley HE, Goldberger AL.

When human walking becomes random walking: fractal analysis and modeling of gait rhythm fluctuations.

Physica A 2001;302(1-4):138-147.

23. Goldberger AL, Amaral LAN, Hausdorff JM, Ivanov PCh, Peng C-K, Stanley HE.

Fractal dynamics in physiology: alterations with disease and aging.

Proc. Natl. Acad. Sci. USA 2002;99[suppl 1]:2466-2472.

24. Lo C-C, Amaral LAN, Havlin S, Ivanov PCh, Penzel T Peter J-H, Stanley HE.

Dynamics of sleep-wake transitions during sleep.

Europhysics Letters 2002;57(5):625-631.

25. Chen Z, Ivanov PCh, Hu K, Stanley HE.

Effect of nonstationarities on detrended fluctuation analysis.

Physical Review E 2002;65(4):041107(15).

26. Kantelhardt JW, Ashkenazy Y, Ivanov PCh, Bunde A, Havlin S, Penzel T, Peter J-H, Stanley HE.

Characterization of sleep stages by correlations in the magnitude and sign of heartbeat increments.

Physical Review E 2002;65(5):051908(6).

27. Carpena P, Bernaola-Galvan P, Ivanov PCh, Stanley HE.

Metal-insulator transition in chains with correlated disorder.

Nature 2002;418:955-959; and 2003;421(6924):764-764.

28. Schulte-Frohlinde V, Ashkenazy Y, Goldberger AL, Ivanov PCh, Costa M, Morley-Davies A, Stanley HE, Glass L.

Complex patterns of abnormal heartbeats.

Physical Review E 2002; 66(3): 031901(12).

29. Karasik R, Sapir N, Ashkenazy Y, Ivanov PCh, Dvir I, Lavie P, Havlin S.

Correlation differences in heartbeat fluctuations during rest and exercise.

Physical Review E, 2002; 66(6): 062902(4).

30. Ashkenazy Y, Hausdorff JM, Ivanov PCh, Stanley HE.

A stochastic model of human gait dynamics.

Physica A 2002;316(1-4):662-670.

31. Kantelhardt JW, Havlin S, Ivanov PCh.

Modeling transient correlations in heartbeat dynamics during sleep.

Europhysics Letters 2003;62(2):147-153.

32. Ashkenazy Y, Havlin S, Ivanov PCh, Peng C-K, Schulte-Frohlinde V, Stanley HE.

Magnitude and sign scaling in power-law correlated time series.

Physica A 2003;323:19-41.

33. Jennings HD, Ivanov PCh, Martins AM, da Silva PC, Vishwanathan GM.

Variance fluctuations in nonstationary time series: a comparative study of music genres.
Physica A 2004;336(3-4):585-594.

34. Ivanov PCh, Yuen A, Podobnik B, Lee Y.
Common Scaling Patterns in Intertrade Times of U.S. Stocks.
Physical Review E 2004; 69(5): 056107(7).

35. Carpena P, Bernaola-Galvan P, Ivanov PCh.
New class of level statistics in correlated disordered chains
Physical Review Letters 2004; 93(17):176804(4).

36. Lo C-C, Chou T, Penzel T, Scammell T, Strecker RE, Stanley HE, and Ivanov PCh.
Common scale-invariant patterns of sleep-wake transitions across mammalian species.
Proc. Natl. Acad. Sci. 2004;101(52):17545-17548.

37. Chen Z, Hu K, Carpena P, Bernaola-Galvan P, Stanley HE, and Ivanov PCh.
Effect of nonlinear filters on detrended fluctuation analysis.
Physical Review E 2005; 71(1):011104(11).

38. Podobnik B, Ivanov PCh, Jazbinsek V, Trontelj Z, Stanley HE, Grosse I.
Power-law correlated processes with asymmetric distributions.
Physical Review E - Rapid Communications, 2005; 71(2):025104(4)(R).

39. Xu L, Ivanov PCh, Hu K, Chen Z, Carbone A, Stanley HE.
Quantifying signals with power-law correlations: A comparative study of detrended fluctuation analysis and detrended moving average techniques.
Physical Review E 2005;71(5):051101(14).

40. Xu L, Chen Z, Hu K, Stanley HE, and Ivanov PCh.

Spurious detection of phase synchronization in coupled nonlinear oscillators.

Physical Review E -Rapid Communications 2006;73(6):065201(4).

41. Shao J, Ivanov PCh, Podobnik B, Stanley HE.

Quantitative relations between corruption and economic factors.

European Physical Journal B 2007; 56(2): 157-166.

42. de la Casa MA, de la Rubia FJ, Ivanov PCh.

Patterns of spiral wave attenuation by low-frequency periodic planar fronts.

Chaos 2007; 17(1):015109(8).

43. Schmitt DT, Ivanov PCh.

Fractal scale-invariant and nonlinear properties of cardiac dynamics remain stable with advanced age: a new mechanistic picture of cardiac control in healthy elderly.

American Journal of Physiology: Regulatory, Integrative and Comparative Physiology 2007; 293(5):R1923-R1937.

44. Ivanov PCh.

Scale-invariant aspects of cardiac dynamics - Observing sleep stages and circadian phases.

IEEE Engineering in Medicine and Biology Magazine 2007; 26(6):33-37.

45. Ivanov PCh, Hu K, Hilton MF, Shea SA, Stanley HE.

Endogenous circadian rhythm in human motor activity uncoupled from circadian influences on cardiac dynamics.

Proc. Natl. Acad. Sci. 2007; 104(52):20702-20707.

46. Podobnik B, Shao J, Njavro D, Ivanov PCh, and Stanley HE.

Influence of corruption on economic growth rate and foreign investment.

European Physical Journal B 2008; 63(4):547-550.

47. Schmitt DT, Stein PK, Ivanov PCh.

Stratification pattern of static and scale-invariant dynamics measures of heartbeat fluctuations across sleep stages in young and elderly.

IEEE Transactions on Biomedical Engineering 2009; 56(5): 1564-1573

48. Ivanov PCh, Ma QDY, Bartsch RP, Hausdorff JM, Amaral LAN, Schulte-Frohlinde V, Stanley HE, Yoneyama M.

Levels of Complexity in Scale-Invariant Neural Signals.

Physical Review E 2009; 79(4):041920(12).

49. Podobnik B, Grosse I, Horvatic D, Ilic S, Ivanov PCh, Stanley HE.

Quantifying cross-correlations using local and global detrending approaches.

European Physical Journal B 2009; 71(2):243-250.

50. de la Casa MA, de la Rubia FJ, Ivanov PCh.

Spiral wave annihilation by low-frequency planar fronts in a model of excitable media.

Europhysics Letters 2009; 86(1):18005.

51. Ivanov PCh, Ma QDY, Bartsch RP.

Maternal-fetal heartbeat phase-synchronization.

Proc Natl Acad Sci USA 2009; 106(33):13641-13642.

52. Ma QDY, Bartsch RP, Bernaola-Galvan P, Yoneyama M, Ivanov PCh.

Effects of extreme data loss on long-range correlated and anticorrelated signals quantified by detrended fluctuation analysis.

Physical Review E 2010; 81(3):031101(17).

53. Romero NE, Ma QDY, Liebovitch LS, Brown CT, Ivanov PCh.

Correlated walks down the Babylonian markets.

Europhysics Letters 2010; 90(1):18004.

54. Schumann AY, Bartsch RP, Penzel T, Ivanov PCh, Kantelhardt JW.

Aging effects on cardiac and respiratory dynamics in healthy subjects across sleep stages.

Sleep 2010; 33(7):943-955.

55. Carretero-Campos C, Bernaola-Galvan P, Ivanov PCh, Carpena P.

Phase transitions in the first-passage time of scale-invariant correlated processes.

Physical Review E 2012; 85(1): 011139(6)

56. Bashan A, Bartsch RP, Kantelhardt JW, Havlin S, Ivanov PCh.

Network physiology reveals relations between network topology and physiologic function.

Nature Communications 2012; 3: 702 doi: 10.1038/ ncomms1705.

57. Perakakis PE, Idrissi S, Vila J, Ivanov PCh.

Dynamical patterns of human postural responses to emotional stimuli.

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58. Bernaola-Galvan P, Oliver JL, Hackenberg M, Coronado AV, Ivanov PCh, Carpena P.

Segmentation of time series with long-range fractal correlations.

European Physical Journal B 2012; 85(6): 211(12).

59. Bartsch RP, Schumann AY, Kantelhardt JW, Penzel T, Ivanov PCh.

Phase transitions in physiologic coupling.

Proc Natl Acad Sci USA 2012; 109(26): 10181-10186.

60. Lo C-C, Bartsch RP, Ivanov PCh.

Asymmetry and basic pathways in sleep-stage transitions.

Europhysics Letters (EPL) 2013; 102(1): 10008

61. Ivanov PCh, Yuen A, Perakakis PE.

Impact of stock market structure on intertrade time and price dynamics.

Plos One 2014; 9(4): e92885

62. Liu KKL, Bartsch RP, Ma QDY, and Ivanov PCh.

Major component analysis of dynamic networks of physiologic organ interactions.

Journal of Physics: Conference Series, 2015; 640, 012013

63. Liu KKL, Bartsch RP, Lin A, Mantegna RN, and Ivanov PCh.

Plasticity of brain wave network interactions and evolution across physiologic states.

Frontiers in Neural Circuits, 2015; 9:62

64. Bartsch RP, Liu KKL, Bashan A, and Ivanov PCh.

Network Physiology: how organ systems dynamically interact.

PLOS ONE, 2015, 10(11): e0142143

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Delay-correlation landscape reveals characteristic time delays of brain rhythms and heart interactions

Phil. Trans. R. Soc. A 2016; 374: 20150182.

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Magnitude and sign of long-range correlated time series: Decomposition and surrogate signal generation.

Physical Review E 2016; 93(4): 042201.

67. Ivanov PCh, Liu KKL, and Bartsch RP.

Focus on the emerging new fields of network physiology and network medicine.

New Journal of Physics, 2016; 18:100201.

68. Xiong W, Faes L, and Ivanov PCh

Entropy measures, entropy estimators, and their performance in quantifying complex dynamics: Effects of artifacts, nonstationarity, and long-range correlations.

Physical Review E, 2017; 95(6): 062114

69. dos Santos Lima GZ, Corso G, Correa MA, Sommer RL, Ivanov PCh, and Bohn F

Universal temporal characteristics and vanishing of multifractality in Barkhausen avalanches.

Physical Review E, 2017; 96(2): 022159

70. Dvir H, Elbaz I, Havlin S, Appelbaum L, Ivanov PCh, and Bartsch RP.

Neuronal noise as an origin of sleep arousals and its role in sudden infant death syndrome.

Science Advances, 2018; 4: eaar6277

71. Wang JWJL, Lombardi F, Zhang X, Anacleto C, and Ivanov PCh.

Non-equilibrium critical dynamics of bursts in θ and δ rhythms as fundamental characteristic of sleep and wake micro-architecture.

PLOS Computational Biology, 2019; 15(11): e1007268.

72. Lombardi F, Gómez-Extremera M, Bernaola-Galván P, Vetrivelan R, Saper CB, Scammell TE, and Ivanov PCh

Critical dynamics and coupling in bursts of cortical rhythms indicate non-homeostatic mechanism for sleep-stage transitions and dual role of VLPO neurons in both sleep and wake.

Journal of Neuroscience, 2020; 40(1), pp.171-190.

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Biophysical Journal, 2020; 118: 1-8

74. Lin A, Liu KKL, Bartsch RP, and Ivanov PCh.

Dynamic network interactions among distinct brain rhythms as a hallmark of physiologic state and function.

Nature Communications Biology, 2020; 3: 197.

75. Balagué N, Hristovski R, Almarcha M, Garcia-Retortillo S, and Ivanov PCh.

Network Physiology of Exercise: Vision and Perspectives.

Frontiers in Physiology 2020; 11: 611550.

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Network Physiology of Cortico–Muscular Interactions

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