

# Quantum Theory and Its Stochastic Limit

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Springer

# Quantum Theory And Its Stochastic Limit

**AN Whitehead**



## Quantum Theory And Its Stochastic Limit:

Quantum Theory and Its Stochastic Limit Luigi Accardi, Yun Gang Lu, Igor Volovich, 2013-03-14 Nowadays it is becoming clearer and clearer that in the description of natural phenomena the triadic scheme microscopic mesoscopic macroscopic is only a rough approximation and that there are many levels of description probably an infinite hierarchy in which the specific properties of a given level express some kind of cumulative or collective behaviour of properties or systems corresponding to the lower levels One of the most interesting challenges for contemporary natural sciences is the comprehension of the connections among these different levels of description of reality and the deduction of the laws of higher levels in this hierarchy from basic laws corresponding to lower levels Since these cumulative or collective phenomena are typically nonlinear effects the transition from this general program to concrete scientific achievements requires the development of techniques which allow physical information to be extracted from nonlinear quantum systems Explicitly intractable examples of such systems are rare and the most interesting physical phenomena are not captured by them Even in the case of linear systems the fact that an explicit solution is formally available is often useless since it is impossible to interpret interesting physical phenomena from it

**Probability Towards 2000** L. Accardi, C.C. Heyde, 1998-03-27 Senior probabilists from around the world with widely differing specialties gave their visions of the state of their specialty why they think it is important and how they think it will develop in the new millennium The volume includes papers given at a symposium at Columbia University in 1995 but papers from others not at the meeting were added to broaden the coverage of areas All papers were refereed

*Quantum Trajectories and Measurements in Continuous Time* Alberto Barchielli, Matteo Gregoratti, 2009-07-21 This course based monograph introduces the reader to the theory of continuous measurements in quantum mechanics and provides some benchmark applications The approach chosen quantum trajectory theory is based on the stochastic Schrödinger and master equations which determine the evolution of the a posteriori state of a continuously observed quantum system and give the distribution of the measurement output The present introduction is restricted to finite dimensional quantum systems and diffusive outputs Two appendices introduce the tools of probability theory and quantum measurement theory which are needed for the theoretical developments in the first part of the book First the basic equations of quantum trajectory theory are introduced with all their mathematical properties starting from the existence and uniqueness of their solutions This makes the text also suitable for other applications of the same stochastic differential equations in different fields such as simulations of master equations or dynamical reduction theories In the next step the equivalence between the stochastic approach and the theory of continuous measurements is demonstrated To conclude the theoretical exposition the properties of the output of the continuous measurement are analyzed in detail This is a stochastic process with its own distribution and the reader will learn how to compute physical quantities such as its moments and its spectrum In particular this last concept is introduced with clear and explicit reference to the measurement process The two

level atom is used as the basic prototype to illustrate the theory in a concrete application Quantum phenomena appearing in the spectrum of the fluorescence light such as Mollow's triplet structure squeezing of the fluorescence light and the linewidth narrowing are presented Last but not least the theory of quantum continuous measurements is the natural starting point to develop a feedback control theory in continuous time for quantum systems The two level atom is again used to

introduce and study an example of feedback based on the observed output      **Selected Papers Of M Ohya** Noboru Watanabe, 2008-02-19 This volume is a collection of articles written by Professor M Ohya over the past three decades in the areas of quantum teleportation quantum information theory quantum computer etc By compiling Ohya's important works in these areas the book serves as a useful reference for researchers who are working in these fields      **Quantum Theory**

Guillaume Adenier, Theo M. Nieuwenhuizen, 2006-01-05 This V xj conference was devoted to the reconsideration of quantum foundations Due to increasing research in quantum information theory especially on quantum computing and cryptography many questions regarding the foundations of quantum mechanics which have long been considered to be exclusively of philosophical interest nowadays play an important role in theoretical and experimental quantum physics      **Encyclopaedia**

**of Mathematics** Michiel Hazewinkel, 2012-12-06 This is the first Supplementary volume to Kluwer's highly acclaimed Encyclopaedia of Mathematics This additional volume contains nearly 600 new entries written by experts and covers developments and topics not included in the already published 10 volume set These entries have been arranged alphabetically throughout A detailed index is included in the book This Supplementary volume enhances the existing 10 volume set Together these eleven volumes represent the most authoritative comprehensive up to date Encyclopaedia of Mathematics available      **The Physics of Communication** Ioannis Antoniou, Viktor Antonovich Sadovnichii, Hansjoachim Walther, 2003 This volume presents the state of the art in the research on new possibilities for communication and

computation based on quantum theory and nonlocality as well as related directions and problems It discusses challenging issues decoherence and irreversibility nonlocality and superluminality photonics quantum information and communication quantum computation      *Probability on Algebraic Structures* Gregory Budzban, Arunava Mukherjee, 2000 This volume presents results from an AMS Special Session held on the topic in Gainesville FL Papers included are written by an international group of well known specialists who offer an important cross section of current work in the field In addition there are two expository papers that provide an avenue for non specialists to comprehend problems in this area The breadth of research in this area is evident by the variety of articles presented in the volume Results concern probability on Lie groups and general locally compact groups Generalizations of groups appear as hypergroups abstract semigroups and semigroups of matrices Work on symmetric cones is included Lastly there are a number of articles on the current progress in constructing stochastic processes on quantum groups      **Proceedings of the Conference Foundations of Probability and Physics--2**

, 2002      □□□□□□, 1996      *Deutsche Nationalbibliographie und Bibliographie der im Ausland erschienenen*

*deutschsprachigen Veröffentlichungen*, 2002      *Modelos Estocásticos II* Daniel Hernández Hernández, José Alfredo López-Mimbela, 2001      *Problems of Modern Mathematical Physics* Vasilii Sergeevich Vladimirov, 2000

**Noncommutative Harmonic Analysis with Applications to Probability** Marek Bożejko, 2007      *Journal of Physics A*, 2002 Focuses on fundamental mathematical and computational methods underpinning physics Relevant to statistical physics chaotic and complex systems classical and quantum mechanics classical and quantum integrable systems and classical and quantum field theory      **Mathematical Reviews**, 2000      *General physics, relativity, astronomy and mathematical physics and methods*, 2006 Rivista internazionale di fisica      **Proceedings of the Cambridge Philosophical Society** Cambridge Philosophical Society, 1968-07      **INIS Atomindex**, 1987      **Stochastic Quantum Mechanics and Quantum Spacetime** Eduard Prugovečki, 1984-01-31 The principal intent of this monograph is to present in a systematic and self contained fashion the basic tenets ideas and results of a framework for the consistent unification of relativity and quantum theory based on a quantum concept of spacetime and incorporating the basic principles of the theory of stochastic spaces in combination with those of Born's reciprocity theory In this context by the physical consistency of the present framework we mean that the advocated approach to relativistic quantum theory relies on a consistent probabilistic interpretation which is proven to be a direct extrapolation of the conventional interpretation of nonrelativistic quantum mechanics The central issue here is that we can derive conserved and relativistically covariant probability currents which are shown to merge into their nonrelativistic counterparts in the nonrelativistic limit and which at the same time explain the physical and mathematical reasons behind the basic fact that no probability currents that consistently describe pointlike particle localizability exist in conventional relativistic quantum mechanics Thus it is not that we dispense with the concept of locality but rather the advanced central thesis is that the classical concept of locality based on point like localizability is inconsistent in the realm of relativistic quantum theory and should be replaced by a concept of quantum locality based on stochastically formulated systems of covariance and related to the aforementioned currents

## Embracing the Melody of Phrase: An Mental Symphony within **Quantum Theory And Its Stochastic Limit**

In some sort of consumed by monitors and the ceaseless chatter of immediate connection, the melodic splendor and mental symphony created by the published term frequently disappear in to the background, eclipsed by the constant noise and disruptions that permeate our lives. But, set within the pages of **Quantum Theory And Its Stochastic Limit** a wonderful literary prize brimming with natural emotions, lies an immersive symphony waiting to be embraced. Constructed by an elegant composer of language, this charming masterpiece conducts viewers on a psychological trip, skillfully unraveling the hidden tunes and profound influence resonating within each cautiously constructed phrase. Within the depths with this moving examination, we will discover the book is key harmonies, analyze its enthralling writing design, and submit ourselves to the profound resonance that echoes in the depths of readers souls.

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