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ABSTRACTS

Presented in alphabetical order

Artur Barasiński, University of Wrocław, Poland

Quantification of Quantum Correlations in Gaussian States Using Photon-Number Measurements

Abstract: Identification, and subsequent quantification of quantum correlations, is critical for understanding, controlling, and engineering quantum devices and processes. We derive and implement a general method to quantify various forms of quantum correlations using solely the experimental intensity moments up to the fourth order. This is possible as these moments allow for an exact determination of the global and marginal impurities of two-beam Gaussian fields. This leads to the determination of steering, tight lower and upper bounds for the negativity, and the Kullback-Leibler divergence used as a quantifier of state nonseparability. The principal squeezing variances are determined as well using the intensity moments. The approach is demonstrated on the experimental twin beams with increasing intensity and the squeezed super-Gaussian beams composed of photon pairs. Our method is readily applicable to multibeam Gaussian fields to characterize their quantum correlations.

Charles Bennett, **IBM, USA**

How Science, and Scientists individually, can stabilize democracies against misinformation-driven discord and disintegration

Abstract: Good (though insufficiently used) techniques exist to authenticate video and other content while it is being generated, preserving its evidentiary value (e.g. distinguishing it from after-the-fact deepfakes) even in hostile environments such as dictatorships and war zones. A harder problem is getting people to care whether what they forward to friends is true. Natural and social scientists, by working together and personally living up to science's core commandment---to question everything, especially their own beliefs—can increase people's respect for science and reduce their taste for flavorful misinformation. I will also discuss how computerizing Occam's Razor can help us reason about our place in the universe without defining "us" or "consciousness".

Paweł Caban, **University of Łódź, Poland**

Entanglement and Bell violation in H to ZZ decay with anomalous coupling

Abstract: In many recent papers the possibility of measuring Bell inequality violation in high energy processes (like decays and scatterings at the LHC) have been discussed. It gives an opportunity to test fundamental quantum mechanical concepts at the TeV energy scale. In this contribution we discuss entanglement and violation of Bell type inequalities for a system of two Z bosons produced in Higgs decays. We take into account beyond the Standard Model (anomalous) coupling between H and daughter bosons.

Jakub Czartowski, **Jagiellonian University in Kraków, Poland**

Iso-entangled Measurements: Uncharted Territory in Quantum Entanglement

Abstract: Although extensive research has focused on investigating quantum state entanglement, there has been a relative neglect in exploring entangled measurements, despite their crucial role in understanding non-locality, as well as their importance in quantum networks and computation. This study systematically examines entangled measurements, providing a comprehensive classification of all equivalence classes of iso-entangled bases related to joint von Neumann measurements on two qubits. Applying this classification to the triangular network, we find that, among various measurements, the Elegant Joint Measurement under white noise and a subset of the Elegant family emerge as the sole measurements yielding output permutation invariant probability distributions when nodes are connected by maximally entangled Bell states. The investigation extends to higher dimensions, culminating in a discussion of partial findings.

Rafał Demkowicz-Dobrzański, **University of Warsaw, Poland**

Quantum metrology using quantum combs and tensor network formalism

Abstract: We develop an effective universal procedure to find optimal adaptive quantum metrological protocols in the presence of noise and show explicitly how it surpasses all the state-of-the-art methods. We break the curse of dimensionality by introducing a novel, tensor network-based

representation. This allows us to find optimal estimation strategies for the number of channels N≈50, whereas the previous approaches only work for N<5 due to their exponential complexity. Importantly, the methods developed are suitable to study metrological models in presence of correlated noise and can be generalized to tackle problems also beyond the standard quantum metrology paradigm.

Marco Genovese, National Metrology Institute of Italy, Italy

New perspectives in quantum imaging: quantum-enhanced quantitative phase imaging

Abstract: The peculiar properties of quantum optical states represent a new resource for innovative imaging schemes [1], as sub shot noise imaging [2] or quantum illumination [3]. In particular, quantum entanglement and squeezing have significantly improved phase estimation and imaging in interferometric settings beyond the classical limits. In this talk, after a general introduction, I will describe the work on quantum imaging performed in INRIM. In particular, I'll present in detail two works.

The first consists of exploiting entanglement to enhance imaging of a pure phase object in a non-interferometric setting, only measuring the phase effect on the free-propagating field. This method, based on the so-called "transport of intensity equation", is quantitative since it provides the absolute value of the phase without prior knowledge of the object and operates in wide-field mode, so it does not need time-consuming raster scanning. Moreover, it does not require spatial and temporal coherence of the incident light. Besides a general improvement of the image quality at a fixed number of photons irradiated through the object, resulting in better discrimination of small details, we demonstrate a clear reduction of the uncertainty in the quantitative phase estimation. Although we provide an experimental demonstration of a specific scheme in the visible spectrum, this research also paves the way for applications at different wavelengths, e.g., X-ray imaging, where reducing the photon dose is of utmost importance. Significant application, in particular in biology, can be envisaged.

In the second, we propose and experimentally demonstrate a novel imaging technique, named Light Field Ghost Imaging, that exploits light correlations and light field imaging principles to enable going beyond the limitations of ghost imaging in a wide range of applications. Notably, our technique removes the requirement to have prior knowledge of the object distance allowing the possibility of refocusing in post-processing, as well as performing 3D imaging while retaining all the benefits of ghost imaging protocols.

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Roman Gielerak, Marek Sawerwain, **University of Zielona Góra, Poland**

On the use of Fredholm determinants to analysis the entropy of quantum infinite-dimensional systems

Abstract: The role played by the concept of von Neumann entropy in the study of quantum entanglement in multipartite quantum systems is widely known. However, in the case of infinite-dimensional quantum systems, it is known that the subset of quantum states for which von Neumann entropy reaches an infinite value and is dense in the space of all quantum states. Using the theory of regularised Hilbert-Fredholm determinants, it was possible to obtain finite (over the entire space of quantum states) formula for the renormalized von Neumann entropy. Some elementary properties of the obtained, renormalized version of von Neumann entropy have been proven using infinite-dimensional Grassmann algebras. In particular, its continuity in a weaker Hilbert-type topology was proven. The proposed and presented mathematical techniques based on the theory of regularised Fredholm determinants can be used for research on other versions of quantum entropy presented in the literature, such as Rényi entropy or Tsallis entropy.

Khrystyna Gnatenko, **Ivan Franko National University of Lviv, Ukraine**

Studies of the properties of weighted and directed graphs on a quantum computer

Abstract: Quantum graph states are multiqubit quantum states that can be associated with graphs. These states find wide applications in quantum computing, including algorithms for quantum error correction, quantum machine learning, and quantum cryptography. The entanglement and geometric properties of quantum graph states corresponding to Ising model, have been studied in [1-3]. These states correspond to undirected and unweighted graphs. Consequently, quantum algorithms for analyzing the properties of such graphs were presented in [1-3]. Additionally, we propose quantum algorithms for analyzing the properties of weighted and directed graphs using quantum devices. These algorithms are based on the relationship between the properties of quantum graph states and the structure of the corresponding graphs. Quantum graph states are prepared by applying noncommuting two-qubit operators with different parameters to an initial state. The entanglement of quantum graph states corresponding to weighted and directed graphs, as well as their geometric properties, are calculated. We anticipate that the results obtained will pave the way for achieving quantum supremacy in studying graph properties through quantum programming with the development of multi-qubit quantum computers

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Hermann Kampermann, **Heinrich-Heine-University Düsseldorf, Germany**

Tight finite secret key rates for the six state protocol

Abstract: We present a tight finite key security proof for QKD protocols with $d+1$ mutually unbiased bases (MUB) based on the uncertainty relation for smooth entropies. The asymptotic secret key rate of the six-state protocol (3 bases) exceeds the one of the BB84 protocol (2 bases) in case of equal quantum bit error rates in all measurement directions. For the BB84 protocol a tight finite key bound is known which is based on the entropic uncertainty relation. This relation, which

is based on two measurement basis, is also sufficient to derive tight key rates for protocols using $d+1$ MUB. In this talk we present the ideas for $d=2$ i.e., the six-state protocol, and analyse the security for the most general attacks. Like in the BB84 case the finite key rate formula equals the asymptotic expression, where one only has to account for statistical uncertainties in the estimated parameters.

Vahid Karimipour, Sharif University of Technology, Iran

The noisy Werner-Holevo channel and its properties

Abstract: We modify the Werner-Holevo channel $\Lambda_{WH}(\rho) =\frac{1}{2}(\tr(\rho)I-\rho^T)$ in such a way that it can model a noisy channel on qutrit states. The new channel is written as $\Lamda(\rho)=(1-x)\rho + x\Lambda_{WH}(\rho)$. We then show that despite the original channel being an extreme point in the space of qutrit channels, the new channel allows a random unitary representation in most of the range of the parameter x. Various properties of this channel are then explored, including its classical and quantum capacities, with or without being assisted by entanglement. In particular we prove it's anti-degradablity and hence zero quantum capacity in the range $x>4/7$.

Christiane P. Koch, Freie Universität Berlin, Germany

Minimizing resources for quantum devices with control theory

Abstract: Quantum technologies are all about controlling quantum systems. Control is the prerequisite to exploit the two essential elements of quantum physics, non-locality and coherence, for practical applications. This currently faces two major challenges --- to preserve the relevant non-classical features at the level of device operation and to scale the devices up in size. Control theory provides tools for tackling both challenges. On the one hand, controllability analysis aims at answering the question which control targets, states or operations, are accessible. On the other hand, control theory provides methods to derive the actual control fields that implement the desired dynamics. I will discuss how to leverage control theory to minimize resources for quantum devices and thus ease requirements towards scaling up their size. In particular, I will show how controllability analysis allows us to identify the minimum number of local controls required to implement universal quantum computing in an array of coupled qubits. Moreover, I will provide examples for the control of open quantum systems where the environment leads to decoherence but also opens new prospects for control. I will discuss examples for both strategies, with practical applications in Rydberg atoms, trapped ions, and superconducting circuits.

Piotr Kolenderski, Nicolaus Copernicus University in Toruń, Poland

Quantum technologies based on single photons

Abstract: I will present results and projects which are carried on at Single Photon Applications Laboratory at Nicolaus Copernicus University in Torun. They are related to experimental research and applications of single photons for quantum communication with a satellite receivers, single photon detectors and entanglement distribution in free space.

Paweł Kurzyński, Adam Mickiewicz University in Poznań, Poland

Exposing Hypersensitivity in Quantum Chaotic Dynamics

Grudka1, P. Kurzyński1, A. S. Sajna2, J. Wójcik3, A. Wójcik1 1 *Institute of Spintronics and Quantum Information, Faculty of Physics, Adam Mickiewicz University, 61-614 Poznań, Poland* 2 *Institute of Theoretical Physics, Faculty of Fundamental Problems of Technology, Wroclaw University of Science and Technology, 50-370 Wroclaw, Poland* 3 *Faculty of Physics, Adam Mickiewicz University, 61-614 Poznańn, Poland* (09.04.2024)

Abstract: We study hypersensitivity to initial state perturbation in unitary dynamics of a multi-qubit system [1]. We use quantum state-metric, introduced by Girolami and Anza in [2], which can be interpreted as a quantum Hamming distance. To provide a proof-of-principle, we take the multi-qubit implementation of the quantum kicked top, a paradigmatic system known to exhibit quantum chaotic behaviour. Our findings confirm that the observed hypersensitivity corresponds to commonly used signatures of quantum chaos. Furthermore, we demonstrate that the proposed metric can detect quantum chaos in the same regime and under analogous initial conditions as in the corresponding classical case.

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Acknowledgements: This research is supported by the Polish National Science Centre (NCN) under the Maestro Grant no. DEC-2019/34/A/ST2/00081. J.W. acknowledges support from IDUB BestStudentGRANT (NO. 010/39/UAM/0010). Part of numerical studies in this work have been carried out using resources provided by Wroclaw Centre for Networking and Supercomputing (wcss.pl), Grant No. 551 (A.S.S.).

Aleksander Lasek, University of Maryland, USA

Non-Abelian symmetry can increase entanglement entropy

Abstract: The pillars of quantum theory include entanglement and operators' failure to commute. The Page curve quantifies the bipartite entanglement of a many-body system in a random pure state. This entanglement is known to decrease if one constrains extensive observables that commute with each other (Abelian "charges"). Non-Abelian charges, which fail to commute with each other, are of current interest in quantum thermodynamics. For example, noncommuting charges were shown to reduce entropy-production rates and may enhance finite-size deviations from eigenstate thermalization. Bridging quantum thermodynamics to many-body physics, we quantify the effects of charges' noncommutation—of a symmetry's non-Abelian nature—on Page curves. First, we construct two models that are closely analogous but differ in whether their charges commute. We show analytically and numerically that the noncommuting-charge case has more entanglement. Hence charges' noncommutation can promote entanglement.

Felix Leditzky, University of Illinois, USA

Enhancing classical communication networks with quantum resources

Abstract: In this talk we explore how classical communication networks can be enhanced with quantum resources. We approach this question from two angles. First, we adopt an information-theoretic point of view and study capacity regions of classical multiple-access channels (MAC). We find that for certain MACs defined in terms of a non-local game the capacity region is enlarged when supplying entanglement to the senders. Non-local games with a perfect quantum strategy such as the

magic square game play a crucial role. Second, we study communication networks from an operational point of view by deriving Bell inequality-like constraints on the possible input-output distributions of classical communication networks with bounded classical communication between nodes. For various network architectures we exhibit violations of these constraints when equipping nodes with quantum resources such as entanglement or quantum communication. Our approach yields protocols to certify quantum resources in communication networks that can also be implemented on quantum networking hardware.

This talk is based on the papers arXiv:1909.02479 (with M. Alhejji, J. Levin, G. Smith), arXiv:2205.13538 (with A. Seshadri, V. Siddhu, G. Smith) and arXiv:2403.02988 (with B. Doolittle and E. Chitambar)

Lorenzo Maccone, University of Pavia, Italy

Mutual Information Bounded by Fisher Information

Abstract: We derive a general upper bound to mutual information in terms of the Fisher information. The bound may be further used to derive a lower bound for Bayesian quadratic cost. These two provide alternatives to the Efroimovich and to the van Trees inequality that are useful also for classes of prior distributions where the latter ones give trivial bounds. We illustrate the usefulness of our bounds with a case study in quantum phase estimation. Here, they allow us to adapt to mutual information the known and highly nontrivial bounds for Fisher information in the presence of noise. This nicely complements quantum metrology, since Fisher information is useful to gauge local estimation strategies, whereas mutual information is useful for global strategies.
See arXiv:2403.10248.

Paweł Machnikowski, Wrocław University of Science and Technology, Poland

Controlling photons with acoustic fields using a solid-state quantum emitter

Abstract: I will present experimental and theoretical results that demonstrate acoustic control of single-photon scattering on a semiconductor quantum dot (QD). I will discuss the non-linear effects of acoustic frequency mixing that allow one to control photon scattering in the frequency domain [1]. I will show that the acoustically induced sidebands in the scattering spectrum exhibit characteristic blinking dynamics, which means that photons are scattered to particular frequency bins at specific times [2]. In addition, going beyond the current experimental state-of-the-art, I will discuss the acoustic sidebands of the Mollow triplet in the high excitation regime and show how the double dressing of states leads to resonances and suppression of the central line of the spectrum.

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Piotr Mironowicz, **Gdańsk University of Technology, Poland**

Entanglement Assisted Collaboration

Abstract: We explore a novel application of entanglement in autonomous robotics, exhibiting quantum advantage in non-cryptographic scenarios. In particular, we consider selected distributed coordination tasks, called rendezvous and domination, where parties are achieving common objectives without communication. The former task addresses the challenge of spatially separated parties attempting to negotiate a meeting point. In the latter task, parties seek to control large portions of a territory. We contrast optimal classical and quantum strategies and elucidate how quantum strategies outperform deterministic approaches across various graph topologies, shedding light on the transformative potential of quantum non-locality in distributed systems. Beyond their theoretical implications, these findings have practical relevance, from covert military operations to exploration missions in hostile environments.

Alexandre Orthey, **Centre for Theoretical Physics, Poland**

Progress on device-independent and almost device-independent schemes of certification of quantum states and measurements

Abstract: The emergence of quantum devices has raised a significant issue: how to certify the quantum properties of a device without placing trust in it. To characterize quantum states and measurements in a device-independent way, up to some degree of freedom, we can make use of a technique known as self-testing. While schemes have been proposed to self-test all pure multipartite entangled states and real local rank-one projective measurements, little has been done to certify mixed entangled states, composite, or non-projective measurements. By employing the framework of quantum networks, we propose a scheme that can be used to self-test any quantum state, projective measurement, and rank-one extremal non-projective measurements. We also construct a family of Bell inequalities that can be used to self-test the two-dimensional tomographically complete set of measurements with an arbitrary number of parties. However, this scheme is costly because it needs more than the minimal number of measurements required to observe any form of quantum nonlocality. Therefore, we also present a multipartite quantum steering scenario with an arbitrary number of parties where only one of them is trusted; that is, the measurements performed by the trusted party are known. Consequently, the self-testing scheme is almost device-independent but it uses only two measurements per party. Then, we propose steering inequalities that are maximally violated by three major classes of genuinely multipartite entangled (GME) states: (i) graph states of arbitrary local dimension; (ii) Schmidt states of arbitrary local dimension; and (iii) N-qubit generalized W states. Using the proposed inequalities, we then provide an almost device-independent certification of the above GME states.

Jukka Pekola **Aalto University, Helsinki, Finland**

Trajectory-based detection in stochastic and quantum thermodynamics

Abstract: I review the experiments that we have carried out over the years on stochastic thermodynamics based on counting single electrons in circuits. I then move on to the concept of monitoring calorimetrically the stochastic evolution of quantum circuits. I present the experimental

feasibility of stochastic quantum thermodynamics and experimental results on continuous monitoring of heat exchange between quantum circuits and on-chip mesoscopic heat baths.

Marcin Płodzień, ICFO, Spain

Generation and storage of many-body quantum correlations in analog and digital quantum simulators

Abstract: Non-classical correlations, namely entanglement and Bell correlations, are fundamental properties of the quantum many-body systems and crucial resources for emerging quantum technologies. The main goal for quantum technologies in the next decade is to generate, characterize, and validate massively correlated quantum states, which can be utilized in quantum metrology, computations and communication. To fully exploit many-body Bell correlations, we need an experimental protocol to generate such quantum states and a method for classifying their depth.

This talk will discuss our recently proposed protocols for generating and classifying metrologically useful many-body entangled and many-body Bell correlated states in analog and digital quantum simulators.

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Pradeep Kiran Sarvepalli, Indian Institute of Technology, Madras, India

*Quantum communication complexity of secret sharing: An emerging direction**

Abstract: A quantum secret sharing (QSS) scheme is a cryptographic protocol to distribute information securely via untrusted parties. In these schemes, specific subsets of parties, called authorized sets,
reconstruct the secret by transmitting their shares, while unauthorized subsets have no information about the secret. Quantum communication complexity refers to the amount of quantum information transmitted to recover the shared secret. Despite extensive research in QSS, there has been little study on optimizing quantum communication during secret recovery. In this talk, we present the first class of communication efficient quantum secret sharing (CE-QSS) schemes. Our schemes are inspired by the classical results of Bitar and El Rouayheb. For a suitable choice of parameters, the proposed technique can reduce the quantum communication complexity by nearly a factor of two for every secret qudit shared. We also propose a general construction for CE-QSS schemes based on

the concatenation of ramp quantum secret sharing schemes. We then demonstrate the optimality of the proposed schemes by providing bounds on quantum communication complexity for secret recovery. We conclude with a brief discussion of future scope and outlook.

*Joint work with Kaushik Senthoor

Oriol Romero-Isart, **University of Innsbruck, Austria**

Levitated Nanoparticles in Macroscopic Quantum Superpositions: Pushing the Boundaries of Quantum Mechanics

Abstract: In recent years, advancements in optically levitated nanoparticles have enabled the cooling of their center-of-mass motion to the quantum ground state. As a result, a nanoparticle, which comprises billions of atoms, becomes delocalized over picometer scales. This talk aims to explore the challenges and requirements of achieving a macroscopic quantum superposition of a nanoparticle, in which the center-of-mass position is delocalized over orders of magnitude larger scales. We will discuss an experimentaly feasible approach that employs fast quantum dynamics in nonharmonic potentials to meet the stringent requirements imposed by environmentally-induced decoherence. The generation of such macroscopic quantum states would test quantum mechanics at unprecedented scales, develop highly sensitive detectors of external signals, and address fundamental questions, such as the nature of the gravitational field generated by a delocalized mass source.

Akshata Shenoy, ICTQT, University of Gdansk, Gdańsk, Poland.

*Quantum machine learning powered quantitative finance**

Abstract: We present a brief overview of the impact of machine learning and quantum machine learning on quantitative finance in the recent years. Specifically, we examine their connection for a range of use cases such as fraud detection, portfolio optimization, etc. by surveying the corpus of literature concerning various financial subdomains.

*Joint work with:

1. Piotr Mironowicz, Politechnika Gdanska, Gdansk, Poland.
2. Antonio Mandarino, ICTQT, University of Gdansk, Gdansk, Poland.
3. Ahmet Ege Yilmaz, Lucerne University of Applied Sciences and Arts, Lucerne, Switzerland.
4. Thomas Ankerband, Lucerne University of Applied Sciences and Arts, Lucerne, Switzerland.

Piotr Szańkowski, Institute of Physics, Polish Academy of Sciences, Poland

Phenomenological Quantum Mechanics: deducing the formalism from experimental observations

Abstract: We propose an exercise where one attempts to deduce the formalism of quantum mechanics from phenomenological observations only. Therefore, in such a thought experiment, the only assumed inputs are the multi-time probability distributions estimated from the results of sequential measurements of quantum observables; no presuppositions about the underlying mathematical structures are allowed. We show that it is indeed possible to derive in such a way a

complete and fully functional formalism that is based on the structures of Hilbert spaces. However, the obtained formal description–the bi-trajectory picture, as we call it–turns out to be quite different from the traditional state-focused formalism. Naturally, one can switch between the two formulations at will, as they are mathematically equivalent. The question is whether it is worth abandoning the bi-trajectory picture in favor of the traditional approach, when the cost is (among others) the introduction of the problematic concept of measurement-induced state collapse.

Tomasz Śmierzchalski, Institute of Theoretical and Applied Informatics, Polish Academy of Sciences, Poland

AI-Powered Error Correction for Quantum Annealers

Abstract: While Quantum Computers hold immense potential, their adoption beyond academic circles remains limited. This is attributed to several factors, including their relatively modest scales and susceptibility to errors, which significantly hamper their utility in practical scenarios. Quantum annealers, a subset of quantum computing devices optimized for discrete optimization tasks, are no exception.

This presentation introduces a novel error correction approach for quantum annealers utilizing reinforcement learning (RL), a machine learning method where an agent learns optimal behavior through trial and error, guided by environmental feedback. Specifically, it explores a post-processing error correction strategy, where errors are addressed after computational completion. The core concept revolves around conceptualizing error correction as a strategic game, termed the "Ising Game", in which an agent is rewarded for enhancing the quality of solutions. This framework facilitates the application of deep RL algorithms, such as the guided Monte Carlo Tree Seach, to navigate the game and rectify errors present in the solution. Implementing deep RL effectively entails intricate technical considerations, particularly regarding neural network architecture. Given the quasi-2D, the graph-based structure of quantum annealers' processing units, Graph Neural Networks emerge as a fitting architectural choice for this application.

Volodymyr Tkachuk, Ivan Franko National University of Lviv, Ukraine

Simulation of spin systems with quantum computers

Abstract: Simulation of quantum systems on classical computers means solving the Schrodinger equation on them, which demands huge resources. For modeling N spins (qubits) on a classical computer, you need an exponentially larger number of classical bits. A quantum computer is truly a quantum system that evolves according to quantum rules. Therefore quantum computers are naturally most suitable for studying quantum systems, especially spin systems. In our recent papers, we propose new noise-resistant algorithms for the study of the dynamical and thermodynamical properties of spin systems on quantum computers. Namely, the new noise-resistant algorithm for the detection of energy levels of quantum systems was proposed in [1,2].
This quantum algorithm is based on the study evolution of the mean value of the operator anticommuting with the Hamiltonian of the system.
A quantum algorithm for the calculation of the partition function of the Ising model on quantum computers based on using ancilla qubits was proposed in [3].
Trace over ancilla qubits relates the Boltzmann factor with the evolution operator.
It allows us to realize on quantum computers the spin systems with complex parameters and to study Lee-Yang and Fisher zeros [4]. Also, this algorithm allows us to find the ground state of the system. It has a direct relation to optimization problems that have practical usage. All algorithms for different spin systems were realized on IBM quantum computers. The results are in good agreement with

theoretical ones.
We hope that with the development of multi-qubit quantum computers with longer coherence time proposed algorithms will allow us to achieve quantum supremacy.

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Lev Vaidman, Tel Aviv University, Israel

An update on counterfactual communication

Abstract: In KCIK 2015 I reviewed counterfactual communication: a communication between spatially separated regions without even a single photon passing between the two parties. I argued that not only transmitting one value of a bit in such a way, the interaction-free measurement, is possible, but also a full communication can be done without leaving a trace in the transmission channel. I will report an experimental progress that has been made, but also present some doubts about interpretation of the results.