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$\rightarrow$ THE BOOK OF ABSTRACTS $\leftarrow$

March 12, 2019

Anna Allilueva[1]

Behavior of short-wave and localized perturbations in relativistic hydrodynamics

Equations of relativistic hydrodynamics are widely used in astrophysics and plasma physics. Due to the non-Hermttian structure of the corresponding linearized operator, small perurbations can grow in time. We study behaviour of small localized and short-wave perturbations of the given mean flow and describe their spatial structure and time evolution.

[1]Moscow Institute of Physics and Technology

Alexander Andrianov[2]

Quantum models with Liouville field: energy density self-adjointness and semiclassical wave packets

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Journal reference:

A. A. Andrianov, C. Lan, O. O. Novikov and Y. F. Wang,

“Integrable Minisuperspace Models with Liouville Field:

Energy Density Self-Adjointness and Semiclassical Wave Packets”

Eur. Phys. J. C **78**, no. 9, 786 (2018)

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doi:10.1140/epjc/s10052-018-6255-5

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Citeable also as: arXiv:1802.06720 [hep-th]

[2]St. Petersburg University

Bijan Bagchi[3]

Evolution operator for time-dependent non-Hermitian systems

The evolution operator U(t) for a time-independent parity-time-symmetric systems is well studied in the literature. However, for the non-Hermitian time-dependent systems, a closed form expression for the evolution operator is not available. In this paper, we make use of a procedure, originally developed by A.R.P. Rau [Phys.Rev.Lett, 81, 4785-4789 (1998)], in the context of deriving the solution of Liuville-Bloch equations in the product form of exponential operators when time-dependent external fields are present, for the evaluation of U(t) in the interaction picture wherein the corresponding Hamiltonian is time-dependent and in general non-Hermitian. This amounts to a transformation of the whole scheme in terms of addressing a nonlinear Riccati equation the existence of whose solutions depends on the fulfillment of a certain accompanying integrabilty condition.

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Journal reference: Lett High Energy Physics 3 (2018) 04

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Citeable also as: arXiv:1809.09377 [math-ph]

[3]Shiv Nadar University

Igor Barashenkov[4]

New PT-symmetric systems with solitons: nonlinear Dirac and Heisenberg ferromagnet equations

Although the spinor field in (1+1) dimensions has the right structure to model a dispersive bimodal system with gain and loss, the plain addition of gain to one component of the field and loss to the other one results in an unstable dispersion relation. In this talk, we advocate a different recipe for the $\mathcal{PT}$-symmetric extension of spinor models — the recipe that does not produce instability of the Dirac equation. We consider the $\mathcal{PT}$-symmetric extensions of nonlinear spinor models and demonstrate a remarkable sturdiness of spinor solitons in two dimensions. Another new class of $\mathcal{PT}$-symmetric systems comprises the Heisenberg ferromagnet with the spin-torque current. In the vicinity of the exceptional point, the corresponding Landau-Lifshitz equation reduces to a nonlinear Schrödinger equation with a quadratic nonlinearity. In the simplest, isotropic, case the equation has the form $i\psi_t + \psi_{xx} - \psi + \psi^2 = 0$. We show that this $\mathcal{PT}$-symmetric Schrödinger equation has stable soliton solutions.

[4]Department of Mathematics and Centre for Theoretical and Mathematical Physics, University of Cape Town

Himadri Barman[5]

Parity-time symmetry-breaking mechanism of dynamic Mott transitions in dissipative systems[6]

I will describe and discuss the critical behavior of the electric field-driven (dynamic) Mott insulator-to-metal transitions in dissipative Fermi and Bose systems in terms of non-Hermitian Hamiltonians invariant under simultaneous parity (P) and time-reversal (T) operations. The dynamic Mott transition is identified as a PT symmetry-breaking phase transition, with the Mott insulating state corresponding to the regime of unbroken PT symmetry with a real energy spectrum. I will follow [1] where we established that the imaginary part of the Hamiltonian arises from the combined effects of the driving field and inherent dissipation. We derived the renormalization and collapse of the Mott gap at the dielectric breakdown and we described the resulting critical behavior of transport characteristics. The obtained critical exponent is in an excellent agreement with experimental findings.

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Reference:

[1] Vikram Tripathi, Alexey Galda, Himadri Barman, and Valerii M. Vinokur, PHYSICAL REVIEW B 94, 041104(R) (2016)

[5] Zhejiang University, Hangzhou, China

[6] poster session; results obtained in collaboration with V. Tripathi, A. Galda and V. M. Vinokur

Carl M. Bender[7]

PT symmetry in quantum mechanics and quantum field theory

PT-symmetric quantum theory began with an analysis of the strange-looking non-Hermitian Hamiltonian $H = p^2 + x^2(ix)^\epsilon$. This Hamiltonian is PT symmetric and the eigenvalues of this Hamiltonian are discrete, real, and positive when $\epsilon \geq 0$. In this talk we describe the corresponding quantum-field-theoretic Hamiltonian

$$H = \frac{1}{2}(\nabla\phi)^2 + \frac{1}{2}\phi^2(i\phi)^\epsilon$$

in D-dimensional spacetime, where ϕ is a pseudoscalar field. We show how to calculate all of the Green's functions as series in powers of ϵ directly from the Euclidean partition function. We derive exact finite expressions for the vacuum energy density, the renormalized mass, and the connected n-point Green's functions for all n and $0 \leq D < 2$. For $D \geq 2$ the one-point Green's function and the renormalized mass become infinite, but perturbative renormalization can be performed. The beautiful spectral properties of PT-symmetric quantum mechanics appear to persist in PT-symmetric quantum field theory.

[7]Washington University, St. Louis

Lucrezia Cossetti[8]

Multipliers method for Spectral Theory

Originally arisen to understand characterizing properties connected with dispersive phenomena, in the last decades the multipliers method has been recognized as a useful tool in Spectral Theory, in particular in connection with proof of absence of point spectrum for both self-adjoint and non self-adjoint operators. Starting from recovering very well known facts about the spectrum of the free Laplacian $H_0 = -\Delta$ in $L^2(\mathbb{R}^d)$, we will see the developments of the method reviewing some recent results concerning self-adjoint and non self-adjoint perturbations of this Hamiltonian in different settings, specifically both when the configuration space is the whole Euclidean space $\mathbb{R}^d$ and when we restrict to domains with boundary. We will show how this technique allows to detect physically natural repulsive and smallness conditions on the potentials which guarantee the absence of eigenvalues.

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The talk is based on joint works with L. Fanelli and D. Krejcirk.

[8]University Roma 1

Shao-Ming Fei[9]

On Characterization of Quantum Uncertainties

We study quantum uncertainty relations in terms of entropic, probabilistic, variance and standard deviation, statistical distance approximation, error and disturbance approaches, with or without quantum memory, as well as their experimental verifications.

[9]Capital Normal University, Beijing

Li Ge[10]

Chiral symmetry in non-Hermitian systems: product rule and Clifford algebra

Chiral symmetry provides the symmetry protection for a large class of topological edge states. It exists in non-Hermitian systems as well, and the same anti-commutation relation between the Hamiltonian and the chiral operator, i.e., $\{H, C\} = 0$, still warrants an energy spectrum that is now symmetric about the origin of the complex energy plane. Here we show two general approaches to construct chiral symmetry in non-Hermitian systems, with an emphasis on lattices with detuned on-site potentials that can vary in both their real and imaginary parts. One approach relies on the simultaneous satisfaction of both non-Hermitian particle-hole symmetry and a non-Hermitian bosonic antilinear symmetry (e.g., PT), while the other utilizes Clifford algebra satisfied by the Dirac matrices.

[10] City University of New York, USA

Ananya Ghatak[11]

New prospects of topology with pseudo-Hermitian systems

In these last 20 years since the PT-symmetric and pseudo-Hermitian quantum theory was introduced, we have tested almost all the theoretical aspects of such systems in the different research fields. Among these, optical and photonic systems serve the most promising platform to build real models. Then, another exciting phenomenon, the topological insulation, has been discovered around 13 years ago rooted from the quantum mechanical version of the models known in condensed matter. Very naturally its become a general curiosity to inspect the classification of topological insulators (TIs) when the systems Hamiltonians are not self-conjugate and the notion of bulk-boundary correspondence (for any TI) fails. Owing to many peculiarities associated with non-Hermitian systems such as exceptional points (where eigenstates coalesce), complex energy landscapes, new and distinct topological invariants arises in such systems which do not have any direct analogue with their Hermitian counterparts. For example, new topological invariant can arise from the winding of the complex bulk energy rather than a gapped energy state for Hermitian systems. Exceptional points also play an important role and half-integer winding and Chern numbers can be produced. After the theoretical challenges, it's also important to build a prototype with an optical or mechanical system.

[11]University of Amsterdam

Yu Guo[12]

Monogamy of entanglement

Recently, we show that any measure of entanglement that on pure bipartite states is given by a strictly concave function of the reduced density matrix is monogamous on pure tripartite states. This includes the important class of bipartite measures of entanglement that reduce to the (von Neumann) entropy of entanglement. Moreover, we show that the convex roof extension of such measures (e.g., entanglement of formation) are monogamous also on *mixed* tripartite states. To prove our results, we use the definition of monogamy without inequalities, recently put forward in Quantum **2**, 81 (2018). Our results promote the theme that monogamy of entanglement is a property of quantum entanglement and not an attribute of some particular measures of entanglement.

[12]Shanxi Datong University

Uwe Günther[13]

The IR-truncated PT-symmetric $V = ix^3$ model and its asymptotic spectral scaling graph

The $\mathcal{PT}-$symmetric quantum mechanical $V = ix^3$ model over the real line, $x \in \mathbb{R}$, is infrared (IR) truncated and considered as Sturm-Liouville problem over a finite interval $x \in [-L, L] \subset \mathbb{R}$. Via WKB and Stokes graph analysis, the location of the complex spectral branches of the $V = ix^3$ model and those of more general $V = -(ix)^{2n+1}$ models over $x \in [-L, L] \subset \mathbb{R}$ are obtained. The corresponding eigenvalues are mapped onto $L-$invariant asymptotic spectral scaling graphs $\mathcal{R} \subset \mathbb{C}$. These scaling graphs are geometrically invariant and cutoff-independent so that the IR limit $L \to \infty$ can be formally taken. Moreover an increasing L can be associated with an $\mathcal{R}-$constrained spectral UV→IR renormalization group flow on $\mathcal{R}$. The existence of a scale-invariant $\mathcal{PT}$ symmetry breaking region on each of these graphs allows to conclude that the unbounded eigenvalue sequence of the ix^3 Hamiltonian over $x \in \mathbb{R}$ can be considered as tending toward a mapped version of such a $\mathcal{PT}$ symmetry breaking region at spectral infinity. This provides a simple heuristic explanation for the specific eigenfunction properties described in the literature so far and clear complementary evidence that the $\mathcal{PT}-$symmetric $V = -(ix)^{2n+1}$ models over the real line $x \in \mathbb{R}$ are not equivalent to Hermitian models, but that they rather form a separate model class with purely real spectra. Our findings allow us to hypothesize a possible physical interpretation of the non-Rieszian mode behavior as a related mode condensation process.

This talk is based on: arXiv:1901.08526 — a joint work with Frank Stefani.

[13]Helmholtz-Center, Dresden

Naomichi Hatano[14]

Exceptional points of the quantum Liuovllian dynamics

The Lindblad equation for a two-level system under an electric field is analyzed by mapping to a linear equation with a non-Hermitian matrix. Exceptional points of the matrix are found to be extensive; the second-order ones are located on lines in a two-dimensional parameter space, while the third-order one is at a point.

[14]Tokyo University

Minyi Huang[15]

Simulating broken PT-symmetric Hamiltonian systems by weak measurement

Simulating PT-symmetric (pseudo-Hermitian) quantum systems with conventional Hermitian quantum mechanics is a useful and important approach to exploring the properties and physical meaning of PT-symmetric Hamiltonians. Despite some works of simulating unbroken PT-symmetric Hamiltonians, it is difficult to simulate broken PT-symmetric quantum systems. We propose a new method of simulation, especially for the broken PT-symmetric case. By embedding a PT-symmetric system into a large Hermitian one, we disclose the relations between PT-symmetric quantum theory and weak measurement theory. It is shown that the weak measurement can give rise to the inner product structure of PT-symmetric systems, with the pre-selected state and its post-selected state resident in the dilated conventional system. Typically in quantum information theory, by projecting out the irrelevant degrees and projecting onto the subspace, even local broken PT-symmetric Hamiltonian systems can be effectively simulated by this weak measurement paradigm.

[15] School of Mathematical Science, Zhejiang University, Hangzhou

Alan Kamuda[16]

Naimarks dilation theorem and its application.

A one-parameter family of bounded and self-adjoint operators E_λ on a Hilbert space $\mathfrak{H}$ is called *a generalized resolution of the identity* if: (1) $E_{\lambda_2} - E_{\lambda_1}$ $(\lambda_2 > \lambda_1)$ is a bounded positive operator on $\mathfrak{H}$; (2) $E_{\lambda-0} = E_\lambda$; (3) $\lim_{\lambda\to-\infty} E_\lambda = 0$; (4) $\lim_{\lambda\to\infty} E_\lambda = I$. A generalized resolution of the identity E_λ with the additional property of orthogonality $E_\mu E_\lambda = E_s$, $s = min\{\lambda, \mu\}$ is called orthogonal resolution of the identity and it can be considered as the spectral function of a self-adjoint operator. The well-known Naimark dilation theorem states that each generalized resolution of the identity admits the dilation to an orthogonal resolution of the identity in a Hilbert space $\widehat{\mathfrak{H}}$ containing $\mathfrak{H}$ as a subspace. Its application to the 1-tight frames leads to the conclusion that each 1-tight frame in $\mathfrak{H}$ is an orthogonal projection of an orthonormal basis of $\widehat{\mathfrak{H}}$. We give another proof of this result, consider various generalizations, and discuss possible application in $\mathcal{PT}$-symmetry framework.

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The talk is based on joint works with Sergiusz Kużel.

[16]AGH University Cracow

Sachin Kumar[17]

Three types of discrete energy eigenvalues in complex PT-symmetric scattering potentials

For complex PT-symmetric scattering potentials (CPTSSPs) $V(x) = V_1 f_{even}(x) + iV_2 f_{odd}(x), f_{even}(\pm\infty) = 0 = f_{odd}(\pm\infty), V_1, V_2 \in \Re$, we show that complex k-poles of transmission amplitude $t(k)$ or zeros of $1/t(k)$ of the type $\pm k_1 + ik_2, k_2 \geq 0$ are physical which yield three types of discrete energy eigenvalues of the potential. These discrete energies are real negative, complex conjugate pair(s) of eigenvalues (CCPEs: $\mathcal{E}_n \pm i\gamma_n$) and real positive energy called spectral singularity (SS) at $E = E_*$ where the transmission and reflection co-efficient of $V(x)$ become infinite for a special critical value of $V_2 = V_*$. Based on four analytically solvable and other numerically solved models, we conjecture that a parametrically fixed CPTSSP has at most one SS. When V_1 is fixed and V_2 is varied there may exist Kato's exceptional point(s) (V_{EP}) and critical values $V_{*m}, m = 0, 1, 2, ..$, so when V_2 crosses one of these special values a new CCPE is created. When V_2 equals a critical value V_{*m} there exist one SS at $E = E_*$ along with m or more number of CCPEs. Hence, this single positive energy E_* is the upper (or rough upper) bound to the CCPEs $\mathcal{E}_l$, corresponding to the last of CCPEs. If $V(x)$ has Kato's exceptional points (EPs: $V_{EP1} < V_{EP2} < V_{EP3} < ... < V_{EPl}$), the smallest of critical values V_{*m} is always larger than V_{EPl}. Hence, in a CPTSSP, real discrete eigenvalue(s) and the SS are mutually exclusive whereas CCPEs and the SS can co-exist.

Reference: Z. Ahmed, S. Kumar, and Dona Ghosh, Phys.Rev. A **98** 042101 (2018).

[17]Bhabha Atomic Research Centre, Mumbai; contribution prepared for poster session

Sergii Kuzhel[18]

Generalized Riesz systems and complete orthonormal sequences in Krein spaces

We analyze special classes of biorthogonal sets of vectors in Hilbert and in Krein spaces and their relations with eigenfunctions of PT-symmetric Hamiltonians.

[18]AGH University Cracow

Ray-Kuang Lee[19]

PT-symmetry in phase space

We present a phase-space study of a non-Hermitian system deriving a continuity equation for the Wigner distribution and arbitrary complex potential, defining a Wigner function flow accordingly. In particular, we reveal how a PT-symmetry breaking manifests itself in the phase-space representation. A quantitative measure on the circulation value for the Wigner function flow shows that the phase transition in the vicinity of the exceptional point (EP) is a continuous function of the system parameter. Our study in phase-space representation indicates that a PT-symmetric phase transition is a second-order phase transition.

[19]National Tsing Hua University, Institute of Photonics Technologies, Hsinchu, Taiwan

Mustapha Maamache[20]

Particle in a complex time-dependent linear potential

The quantum motion of a the well-known Lewis and Riesenfeld method [1-4] is investigated for quantum systems governed by time-dependent non-Hermitian Hamiltonians, particularly in the case where the quantum system is a particle submitted to action of a complex time-dependent linear potential.

By using a linear pseudo hermitian invariant operator, we solve analytically the time-dependent Schroedinger equation for this problem and construct a Gaussian wave packet solution. Then, using this Gaussian wave packet, we calculate the expectation values of the position and the momentum as well as the uncertainty product.

We find that these expectation values of x and p are complex numbers so that these operators are not physical observables but describe the classical motion. On the other side, the uncertainty relation is physically acceptable.

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[20] Ferhat Abbas University Setif 1, Algeria

Oleg Novikov[21]

Scattering in the pseudo-Hermitian quantum field theory

The intertwining operator for the pseudo-Hermitian interpretation of the PT-symmetric quantum field theory is known to be nonlocal. This raises the question whether such models satisfy the principle of the relativistic causality. We consider the perturbative S-matrix in the equivalent Hermitian description and find very simple relation to the S-matrix in the non-Hermitian description that however in general results in the causality violation if the non-Hermitian QFT is local. We confirm the implications of this relation by direct calculation of the 2-point and 4-point correlation functions of the fields in the equivalent Hermitian description of the $i\phi^3$ model.

[21]University of St. Petersburg

Cemile Nur[22]

On the estimations of eigenvalues of Sturm-Liouville operators with PT-symmetric potentials

We give estimates for the eigenvalues of non-self-adjoint Sturm-Liouville operators with periodic and antiperiodic boundary conditions for PT-symmetric potentials. Moreover, we present some numerical examples for PT-symmetric periodic optical potentials.

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Keywords

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Eigenvalue estimations, periodic and antiperiodic boundary conditions, PT-symmetric potentials, optical potentials.

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Results obtained in collaboration with Oktay Veliev

[22] Istanbul

Franck Onanga[23]

Robust and fragile aspects of topological transition in non-unitary discrete time quantum walks

Non-unitary quantum walks, with topology defined by two coin parameters and mode-specific losses, sometimes show quantized mean displacement that has been experimentally observed [1]. Similar to its counterpart in a lossy Su-Schrieffer-Heeger (SSH) model [2], this quantization is often refereed to as topological [3]. Starting with an arbitrary coin state of the walker, I will show that the mean displacement is neither quantized nor robust, but has a topological piece and a part that can be interpreted as the ballistic classical motion. These results are discrete-time-quantum walk analogs of corresponding results for the lossy SSH model [4]. Our results can be easily observed in current experimental set up.

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[4] A.K. Harter, A. Saxena, and Y.N. Joglekar. Sci. Rep. 8, 12065 (2018).

[23]IUPUI, Indianapolis

Mauricio P. Pato[24]

Some eigenvalue properties of pseudo-Hermitian matrices[25]

As matrices which are connected to their adjoints by a similarity transformation, pseudo-Hermitian matrices have eigenvalues that are real or complex conjugate. By imposing this condition to the three classes of the Gaussian ensemble of random matrix theory, equivalent pseudo-Hermitian pHGOE, pHGUE and pHGSE classes of Gaussian matrices whose elements, respectively, are real, complex and quaternions are constructed [1, 2]. In my talk, I will discuss statistical properties of the eigenvalues of this kind of pH-ensemble obtained using two approaches:
1. By investigating the two first moments of its random characteristic polynomials [3].
2. By considering separately the spacing distribution of the eigenvalues that remain in the real axis and of those in the complex plane [4].

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[3] G. Marinello and M. P. Pato, J. Phys. A: Math. Theor. **51**, 375003 (2018).

[4] G. Marinello and M. P. Pato, submitted to PRE.

[24]Instituto de Física, Universidade de São Paulo

[25]This is a collaboration with G. Marinello

Bingkun Qi[26]

Linear Localization of non-Hermitian Zero Modes[27]

Wave localization [1] is one of the most celebrated physical phenomena in the past century. The band picture successfully explained localization of noninteracting or linear waves in a periodic structure, which revealed the distinction between normal metals and insulators. The existence of a sizable bandgap is also crucial for the robustness of topological insulators and Majorana zero modes. The zero mode in the bandgap is also a localized edge state. A similar transition from localized states to extended states takes place in disordered systems. In this Letter we probe whether a symmetry protected zero mode [2,3] exhibits exotic behaviors at the transition between localized and extended regimes. Remarkably, we observe a linear localization phenomenon: when weakly coupled to a non-Hermitian reservoir, a zero mode can display a linearly decreasing amplitude as a function of space in the reservoir, with an attenuation factor of order unity. Through the discussion of a linear homogeneous recurrence relation, we attribute this phenomenon to the underlying non-Hermitian particle-hole symmetry and the zeroness of its energy eigenvalue. We also show that linear localization bears a strong resemblance to critical damping, even though the latter does not display linear temporal dynamics.

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[26]CUNY, Staten Island, CUNY, New York, and Peking University, Beijing

[27]poster session; results obtained in collaboration with Li Ge

Rajkumar Roychoudhury[28]

Real and PT Symmetric Isospectral Partners of a PT Symmetric Hamiltonian

We show here how a series of isospectral supersymmetric partners can be obtained for a PT symmetric complex Hamiltonian. A summary of some rather old results will also be presented.

[28]Advanced Centre of Nonlinear and Complex Phenomena, Kolkata

Andrey Shafarevich[29]

Semiclassical states, corresponding to separatrices of classical Hamiltonian systems

It is well known that stable periodic trajectories of classical Hamiltonian systems define semi-classical states of the corresponding quantum operators. We study analogous correspondence for singular trajectories - separatrices, containing rest points. Orbital stability in this case must be replaced by the compactness of certain holonomy group. We obtain the generalized quantization conditions.

[29]Moscow State University

Qinghai Wang[30]

Piecewise adiabatic following in non-Hermitian cycling

I will show the possibility of piecewise adiabatic following interrupted by hopping between instantaneous system eigenstates in non-Hermitian cycling. This phenomenon can be understood in terms of the Stokes phenomenon. Interestingly, the critical boundary for piecewise adiabatic following is found to be unrelated to the domain for exceptional points. Several exactly solvable models will be presented. This work exposes the rich features of nonunitary dynamics in cases of slow cycling and should stimulate future applications of nonunitary dynamics.

[30]University of Singapore

Guenter Wunner[31]

Dynamics in PT-symmetric nonlinear metamaterials

$\mathcal{PT}$-symmetric nonlinear metamaterials are known to feature discrete breather solutions. We present new analytical and numerical results for breathers in $\mathcal{PT}$-symmetric metamaterials in one- and two-dimensional geometry. We first introduce the basic building block of the arrangements, the dimer, and the systems under investigation, viz., nonlinear split-ring resonators with electrical and magnetic coupling in one and two dimensions, and derive the nontrivial equations describing these systems. We succeed in finding an approximate analytical description of the breathers for the $\mathcal{PT}$-symmetric nonlinear dimer chain and dimer plane which agrees very well with the numerical results. The analytical model enables us to characterize new multi-breather solutions. These solutions turn out to be a hybrid of discrete breathers and plane waves.

Work done in collaboration with Sascha Böhrkircher, Sebastian Erfort, and Holger Cartarius.

[31]University of Stuttgart

Li-Jun Zhao[32]

Additivity of entanglement of formation via entanglement-breaking space

We study the entanglement-breaking (EB) space, such that the entanglement of formation (EOF) of a bipartite quantum state is additive when its range is an EB subspace. We systematically construct the EB spaces in the Hilbert space $\mathbb{C}^m \otimes \mathbb{C}^3$, and the 2-dimensional EB space in $\mathbb{C}^2 \otimes \mathbb{C}^n$. We characterize the expression of two-qubit states of rank two with nonadditive EOF, if they exist. We further apply our results to construct EB spaces of an arbitrarily given dimensions. We show that the example in [PRL 89,027901(2002)] is a special case of our results. We further work out the entanglement cost of a qubit-qutrit state in terms of the two-atom system of the Tavis-Cummings model.

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Journal reference: Phys. Rev. A, in print

[32] Beihang University; poster session

Miloslav Znojil[33]

Non-Hermiticities and exceptional points

In non-Hermitian and, in particular, in PT-symmetric quantum mechanics one of the most characteristic mathematical features of the formalism is the explicit Hamiltonian-dependence of the physical Hilbert space of states. Some of the most important physical consequences will be discussed, with emphasis on the dynamical regime in which the system is close to the Kato's exceptional point *alias*, in the language of phenomenology, to the quantum phase transition.

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[33]NPI, The Czech Academy of Sciences, Řež