
Parity Time Symmetric Coupled Systems With Varying Loss

Accessing the exceptional points of parity time symmetric. Frontiers Tunable Unidirectivity of Metal Dielectric. A parity time symmetric coherent plasmonic absorber. Parity time symmetric coupled systems with varying loss. Microwave Tunneling and Robust Information Transfer Based. Focus on Parity Time Symmetry in Optics and Photonics. Controlled optical bistability in parity time symmetric. Dispersion properties of coupled waveguides with loss and. Neuromorphic Functions of Light in Parity Time Symmetric. PT Symmetry on a Chip Harnessing Optical Loss for Novel. Asymmetric scattering of flexural waves in a parity time. Parity Time Symmetry in Bidirectionally Coupled. Asymmetric solitons in parity time symmetric double hump. PT symmetric laser absorber Journal Article OSTI GOV. Parity time symmetric photonics National Science Review. Anti Parity Time Symmetric Optical Four Wave Mixing in. OSA Fluctuations and noise limited sensing near the. Optomechanically induced transparency in parity time. Parity Time Symmetric Optics in Compound Microtoroid Cavities. Parity time symmetric coupled systems with varying loss. IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION VOL 65 NO. Complex Berry phase dynamics in mathematical PT symmetric. Parity time symmetry in coherently coupled vertical cavity. Nonlocal gap solitons in parity time symmetric coupler. PDF Parity Time Symmetric Coupled Microresonators with a. Electrically Injected Single Transverse Mode Coupled. Local PT Invariance and Supersymmetric Parametric Oscillators. Dynamics of generalized PT symmetric dimers with time. Parity time symmetry breaking in optically coupled. Parity Time Symmetry in Coherently Coupled Vertical Cavity. Loss induced suppression and revival of lasing Science. Parity time symmetric whispering gallery microcavities. Nonlinear modal interactions in parity time PT symmetric. Nonlinear modal interactions in parity time PT symmetric. Giant nonlinearity via breaking parity time symmetry A. Exceptional Points of Degeneracy Induced by Linear Time. Optical fluxes in coupled cal PT symmetric photonic. The PT Symmeter PT Symmetry articles and information. Parity time symmetric complex coupled distributed feedback. Dynamical control of solitons in a parity time symmetric. METHOD AND SYSTEM FOR PARITY TIME SYMMETRIC OPTICS AND. Parity time symmetry in optical microcavity systems. Observation of exceptional points in magnonic parity time. Locally Parity Time Symmetric and globally Parity. An invisible acoustic sensor based on parity time symmetry. Nonlocal gap solitons in parity time symmetric coupler. Observation of exceptional points in magnonic parity time. An invisible acoustic sensor based on parity time symmetry. Parity time symmetry in coherently coupled vertical cavity. Integrability of PT symmetric dimers

Accessing the exceptional points of parity time symmetric

March 29th, 2016 - Parity time PT symmetric systems experience phase transition between PT exact and broken phases at exceptional point These PT phase transitions contribute significantly to the design of single mode lasers coherent perfect absorbers isolators and diodes However such exceptional points are extremely difficult to access in practice because'

'Frontiers Tunable Unidirectivity of Metal Dielectric

October 17th, 2019 - Parity time PT symmetric photonic systems have attracted much attention due to their intriguing properties and asymmetric behaviors In this paper we propose a plasmonic nanoantenna with PT symmetric potential for unidirectional scattering functionality The studied plasmonic nanoantenna is comprised of three metallic layers separated by two'

'A parity time symmetric coherent plasmonic absorber

December 10th, 2019 - Non Hermitian parity time P T symmetric optical potentials have led to a new class of unidirectional photonic components based on the spatially symmetric and balanced inclusion of loss and gain While most proposed and implemented P T symmetric optical devices have wavelength scale dimensions no physical constraints preclude development of subwavelength P T symmetric components'

'Parity time symmetric coupled systems with varying loss

November 26th, 2019 - This work analyses the propagation of soliton beam in parity time symmetric nonlinear coupled systems with varying loss gain profiles When the loss gain coefficient is a constant the phase transition takes place when it is equal to twice the coupling constant and the beam propagation is unstable above the phase transition point When the "Microwave Tunneling and Robust Information Transfer Based

December 24th, 2019 - Robust signal transfer in the form of electromagnetic waves is of fundamental importance in modern technology yet its operation is often challenged by unwanted modifications of the channel connecting transmitter and receiver Parity time PT symmetric systems combining active and passive elements in a balanced form provide an interesting'

'Focus on Parity Time Symmetry in Optics and Photonics

December 14th, 2015 - Instantaneous modulations in time varying complex optical Despite the benefits which the directional couplers based on parity time symmetric systems may offer to the field of integrated equation with a symmetric potential is used to model an optical structure consisting of an element with gain coupled to an element with loss'

'Controlled optical bistability in parity time symmetric

December 16th, 2019 - Controlled optical bistability in parity time symmetric coupled micro cavities First two terms of the Hamiltonian correspond to the passive and active cavity systems with loss and gain

factor The zero intensity windows for both the cases can be tuned by varying photon tunnelling strength"**Dispersion properties of coupled waveguides with loss and**

October 28th, 2019 - Abstract Waveguide structures with a balance of loss and gain have been frequently discussed in the photonic community not only as photonic analogues of quantum mechanical systems with parity time PT symmetry breaking but also as components with potentially interesting technical applications'

'Neuromorphic Functions of Light in Parity?Time?Symmetric December 19th, 2019 - Neuromorphic Functions of Light in Parity?Time?Symmetric Systems Sunkyu Yu Photonic Systems Laboratory model 1 we show that PT?symmetric coupled resonators of saturable gain and loss satisfy the criteria of interacting state?dependent wave channels The time?varying function"PT Symmetry on a Chip Harnessing Optical Loss for Novel

November 30th, 2019 - The development of non Hermitian parity time PT symmetric quantum mechanics has offered a L et al Parity time symmetry and variable optical isolation in active passive coupled microresonators Nat et al Unconventional modes in lasers with spatially varying gain and loss Phys Rev A 84 023820 2011 ADS CrossRef Google Scholar'

'Asymmetric scattering of flexural waves in a parity time

December 16th, 2019 - Non Hermitian parity time P T symmetric systems that possess real eigenvalues have been intensively investigated in quantum mechanics and rapidly extended to optics and acoustics demonstrating a lot of unconventional wave phenomena"**Parity?Time Symmetry in Bidirectionally Coupled September 4th, 2019 - We report on the numerical analysis of intensity dynamics of a pair of mutually coupled single mode semiconductor lasers that are operated in a configuration that leads to features reminiscent of parity?time symmetry Starting from the rate equations for the intracavity electric fields of the two lasers and the rate equations for carrier'**

'Asymmetric solitons in parity time symmetric double hump

November 26th, 2019 - Symmetric and asymmetric solitons that form in self focusing optical wave guides with parity time PT symmetric double hump Scarff II potentials are investigated It is shown that the branch corresponding to asymmetric solitons bifurcates out from the base branch of PT symmetric solitons with the increasing of the input power"PT symmetric laser absorber Journal Article OSTI GOV

December 2nd, 2019 - Non Hermitian parity time PT symmetric optical potentials have led to a new class of unidirectional photonic components based on the spatially symmetric and balanced inclusion of loss and gain While most proposed and implemented PT symmetric optical devices have wavelength scale dimensions

no physical constraints preclude development of subwavelength PT symmetric components'

'Parity-time symmetric photonics National Science Review December 27th, 2019 - Han Zhao Liang Feng Parity-time symmetric photonics National Science Review Volume 5 Issue 2 March 2018 Pages 183-199 In addition to the non Hermitian coupled systems discussed above This unidirectional invisibility using the PT symmetric scheme has been experimentally observed in coupled gain and loss fiber loops"*Anti Parity Time Symmetric Optical Four Wave Mixing in*

December 26th, 2019 - Recently the notion of parity time PT symmetry 1-5 has started to attract significant attention owing to its potential for novel optical effects that are unattainable with usual Hermitian systems For instance coupled optical waveguides with balanced gain and loss can be used to steer optical beam profiles inaccessible with conservative'

'OSA Fluctuations and noise limited sensing near the

*October 17th, 2018 - Exceptional points of parity time PT symmetric systems hold an intriguing potential for highly sensitive sensors Here we theoretically explore the role of mesoscopic fluctuations and noise on the spectral and temporal properties of systems of PT symmetric coupled gain-loss resonators operating near the exceptional point where"***Optomechanically induced transparency in parity time**

January 26th, 2017 - Optomechanically induced transparency OMIT and the associated slowing of light provide the basis for storing photons in nanoscale devices Here we study OMIT in parity time PT symmetric microresonators with a tunable gain to loss ratio'

'Parity Time Symmetric Optics in Compound Microtoroid Cavities

October 19th, 2019 - optics using two directly active passive coupled microtoroid cavities at the telecom band Non Hermitian parity time PT symmetric quantum mechanics¹ has stimulated extensively theoretical research over a decade One of the most striking properties of a PT symmetric operator is the appearance of a'

'Parity time symmetric coupled systems with varying loss

February 29th, 2016 - This work analyses the propagation of soliton beam in parity-time P T symmetric nonlinear coupled systems with varying loss gain profiles When the loss gain coefficient is a constant the phase transition takes place when it is equal to twice the coupling constant and the beam propagation is'

'IEEE TRANSACTIONS ON ANTENNAS AND PROPAGATION VOL 65 NO

November 28th, 2019 - condition yet unexplored in the contest of gain and loss We show that coupled transmission lines CTLs at radio frequencies having gain active devices and loss e.g material radiation balance exhibit EPDs We demonstrate the concept of parity-time PT

'Complex Berry phase dynamics in mathcal PT symmetric September 10th, 2019 - Complex Berry phase dynamics in PT symmetric coupled waveguides Rosie Hayward and Fabio Biancalana and at least one periodically varying parameter can be purely imaginary is hence no longer a true phase and Hermitian with the weaker condition of parity time PT symmetry a type of spacetime re?ection symmetry'

'Parity time symmetry in coherently coupled vertical cavity October 20th, 2016 - We report parity time PT symmetry breaking in electrically injected coherently coupled vertical cavity surface emitting laser arrays We predict beam steering mode evolution and mode hopping as consequences of the non Hermiticity of the array analyzed by the temporal coupled mode theory with both an asymmetric gain distribution and local"Nonlocal gap solitons in parity time symmetric coupler

November 28th, 2019 - This work analyses the propagation of soliton beam in parity?time symmetric nonlinear coupled systems with varying loss gain profiles When the loss gain coefficient is a constant the phase transition takes place when it is equal to twice the coupling constant and the beam propagation is unstable above the phase transition point"PDF

Parity Time Symmetric Coupled Microresonators with a November 24th, 2019 - The paper reports on the coupling of Parity Time PT symmetric whispering gallery resonators with realistic material and gain loss models Response of the PT system is analyzed for the case of low and high material and gain dispersion and also for two practical scenarios when the pump frequency is not aligned with the resonant frequency of"Electrically Injected Single Transverse Mode Coupled

November 25th, 2016 - Electrically Injected Single Transverse Mode Coupled Waveguide Lasers by Parity time PT Symmetry Ruizhe Yao Chi Sen Lee Viktor Podolskiy and Wei Guo Physics and Applied Physics Department University of Massachusetts Lowell Lowell MA 01854 USA wei.guo@uml.edu Abstract In this report we demonstrate the single transverse mode'

'Local PT Invariance and Supersymmetric Parametric Oscillators

November 28th, 2019 - Local PT invariance and supersymmetric parametric oscillators We introduce the concept of local parity time symmetric PT invariance in optical waveguides this powerful tool we present analytical solutions for optical beam propagation in local PT invariant coupled systems and we show that the intensity tunneling between the two'

'Dynamics of generalized PT symmetric dimers with time December 7th, 2019 - A Parity Time PT symmetric system with periodically varying in time gain and loss modeled by two coupled Schrodinger equations dimer is studied It is shown that the problem can be reduced to a perturbed pendulum like equation

This is done by finding two constants of motion "Parity time symmetry breaking in optically coupled
November 21st, 2019 - operations of parity P and time reversal T may have a set of entirely real eigenvalues 1 In particular the eigenvalues can undergo a transition from purely real to complex upon changing a parameter that controls the non Hermiticity of the Hamiltonian These surprising results sparked a theoretical interest in PT symmetric systems'

'Parity Time Symmetry in Coherently Coupled Vertical Cavity
April 22nd, 2018 - The optical realization of non Hermitian parity time PT symmetric system has drawn great interest in recent years 1?16 An optical system with a symmetric index profile and an antisymmetric gain loss profile formally exhibits PT symmetry by an analogy to the PT symmetry in quantum mechanics 1 2'

'Loss induced suppression and revival of lasing Science
October 16th, 2014 - Controlling and reversing the effects of loss are major challenges in optical systems For lasers losses need to be overcome by a sufficient amount of gain to reach the lasing threshold In this work we show how to turn losses into gain by steering the parameters of a system to the vicinity of an exceptional point EP which occurs when the "Parity?time symmetric whispering gallery microcavities

December 15th, 2019 - To investigate the PT symmetric coupled resonator system The coupling strength is tuned by varying the distance between the two resonators⁶ This can be achieved by fabricating each of the resonators at the edge of a different chip and by controlling the Parity?time symmetric whispering gallery microcavities

SUPPLEMENTARY INFORMATION "Nonlinear modal interactions in parity time PT symmetric

April 5th, 2016 - Parity time symmetric lasers have attracted considerable attention for a given γ is very different from other models that have been applied to study steady states in symmetric systems 43 Rotter S Türeci H E amp Stone A D Unconventional modes in lasers with spatially varying gain and loss Phys Rev'

'Nonlinear modal interactions in parity time PT symmetric
July 30th, 2017 - Nonlinear modal interactions in parity time PT symmetric lasers PMID 27143324 PMCID this constraint on for a given γ is very different from other models that have been applied to study steady states in symmetric systems 43 44 45 This is due to the outcoupling loss that is not considered in the coupled mode theory"

"Giant nonlinearity via breaking parity time symmetry A
November 17th, 2019 - Here we present a general mechanism to amplify nonlinearity using parity time PT symmetric structures and show that an on chip microscale phonon diode can be fabricated using a PT symmetric mechanical system in which a lossy mechanical resonator with very weak mechanical nonlinearity is coupled to a mechanical resonator'

'Exceptional Points of Degeneracy Induced by Linear Time

*November 21st, 2019 - We present a general theory of exceptional points of degeneracy EPD in periodically time variant systems We show that even a single resonator with a time periodic component is able to develop EPDs contrary to parity time PT symmetric systems that require two coupled resonators'***Optical fluxes in coupled cal PT symmetric photonic**

December 2nd, 2019 - In this work we examine longitudinal and transverse optical fluxes in P T symmetric photonic systems starting with a P T dimer consisting of two parallel waveguides in the coupled mode regime The longitudinal flux reflects the change of the total intensity as a function of the propagation distance time and is hence a measure of local gain'

'The PT Symmeter PT Symmetry articles and information

December 8th, 2019 - A Parity Time PT symmetric system with periodically varying in time gain and loss modeled by two coupled Schrodinger equations dimer is studied It is shown that the problem can be reduced to a perturbed pendulum like equation This is done by finding two constants of motion'

'Parity time symmetric complex coupled distributed feedback

November 24th, 2019 - In this paper we propose an external optical feedback resistant distributed feedback DFB laser diode LD by exploiting parity time symmetric complex coupling With its complex refractive index'

'Dynamical control of solitons in a parity time symmetric

November 15th, 2019 - 1 Introduction One of the most fundamental tenets in physics is the charge parity time CPT symmetry which holds for all Lorentz invariant systems obeying the causality principle It implies invariance of the system with respect to the combined parity transformation P which reverses the coordinate axes charge conjugation C which

METHOD AND SYSTEM FOR PARITY TIME SYMMETRIC OPTICS AND

November 27th, 2019 - CROSS REFERENCE TO RELATED

APPLICATION This application claims priority to and the benefit of U S Provisional Patent Application Ser No 61 979 153 entitled METHOD AND SYSTEM FOR PARITY TIME SYMMETRIC OPTICS AND NONRECIPROCAL LIGHT TRANSMISSION filed Apr 14 2014 which is incorporated by reference herein in its entirety'**Parity time symmetry in optical microcavity systems**

November 18th, 2019 - and loss in optical settings In particular with coupled waveguides they formulated PT symmetric optics by providing a simple but nontrivial framework for the study of PT symmetric systems It was shown that in waveguide structures the parity operator leads to spatial reflection while the time reversal operator reverses the propagation'

'Observation of exceptional points in magnonic parity time

December 20th, 2019 - gain and loss in the two optical components passive ?? symmetric systems that comprise two components with different optical losses have also been demonstrated in photonics 4 25 Moreover anti crossing of eigenfrequencies and manipulated spin current have been observed in the strongly coupled magnon photon system 18 19 *Locally Parity Time Symmetric and globally Parity*

December 23rd, 2019 - Locally Parity Time Symmetric and globally Parity Symmetric systems W W Ahmed 1 R Herrero M Botey and K Staliunas 1 2 1Departament de Física Universitat Politècnica de Catalunya UPC Colom 11 E 08222 Terrassa Barcelona Spain'

'An invisible acoustic sensor based on parity time symmetry

January 5th, 2015 - This unique sensing device is based on the unusual scattering properties of a parity time PT symmetric metamaterial device formed by a pair of electro acoustic resonators loaded with suitably tailored non Foster electrical circuits constituting the acoustic equivalent of a coherent perfect absorber coupled to a coherent laser" **Nonlocal gap solitons in parity time symmetric coupler**

August 9th, 2019 - In this work we study the nonlocal gap solitons in a parity time symmetric coupler with transverse real periodic potential having defocusing nonlocal nonlinearity The propagation invariant solutions show that the system supports both high frequency and low frequency modes as long as the gain loss coefficient is less than the coupling coefficient'

'Observation of exceptional points in magnonic parity time

November 22nd, 2019 - Non Hermitian Hamiltonians may still have real eigenvalues provided that a combined parity time ?? symmetry exists The prospect of ?? symmetry has been explored in several physical systems such as photonics acoustics and electronics The eigenvalues in these systems undergo a transition from real to complex at exceptional points EPs'

'An invisible acoustic sensor based on parity time symmetry

December 21st, 2019 - An invisible acoustic sensor based on parity time symmetry Romain Fleury¹ Dimitrios Sounas¹ and Andrea Alu¹ Sensing an incoming signal is typically associated with absorbing a portion of its energy inherently perturbing the measurement and creating reflections and shadows Here in con'

'Parity time symmetry in coherently coupled vertical cavity

December 6th, 2019 - Parity time symmetry in coherently coupled The optical realization of non Hermitian parity time PT symmetric systems has drawn great interest in recent years ric In this case the evolution of the coupled modes with varying gain contrast is illustrated in Fig 2'

'Integrability of PT symmetric dimers

December 9th, 2019 - The coupled discrete linear and Kerr nonlinear Schrödinger equations with gain and loss describing transport on dimers with parity time PT symmetric potentials are considered The model is relevant among others to experiments in

optical couplers and proposals on Bose Einstein condensates in PT symmetric double well potentials"

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