



THE HEBREW UNIVERSITY OF JERUSALEM  
ISRAEL INSTITUTE FOR ADVANCED STUDIES

# Quantum (and Classical) Physics with Non-Hermitian Operators (PHHQ13)

July 12-16, 2015

All lectures will take place at the Israel Institute for Advanced Studies, room 130,  
on the Edmond J. Safra, Givat Ram Campus

Click on any of the speaker names to display talk titles and abstracts

## Organizers:

**Carl M. Bender** (Washington University in St. Louis)  
**Jonathan Breuer** (The Hebrew University of Jerusalem)  
**Joshua Feinberg** (Haifa University & The Technion)  
**Miloslav Znojil** (Academy of sciences of the Czech Republic)

# Program

## Sunday, 12 July

- 08:30 - 09:30     Registration
- 09:30 - 10:00    Welcome addresses
- 10:00 - 11:00    **Carl M. Bender** (Washington University in St. Louis)  
PT symmetry and the taming of instabilities
- 11:00 - 11:30    Coffee Break
- 11:30 - 12:30    **Lev Vaidman** (Tel Aviv University)  
Effective Non-Hermitian Hamiltonian of a pre- and post-selected quantum system
- 12:30 - 14:30    Lunch
- 14:30 - 15:30    **Uwe Guenther** (Helmholtz Zentrum Dresden Rossendorf)  
Hamiltonian and dissipative second-order polynomial flows on spheres  $S^2$
- 15:30 - 16:30    **Andrey V. Sokolov** (Saint-Petersburg State University)  
Spectral Design for Non-Hermitian Matrix Hamiltonians.
- 16:30 - 17:00    Coffee Break
- 17:00 - 18:00    **Michael Ogilvie** (Washington University in St. Louis)  
PT Symmetry and QCD at finite density

18:00 - 18:30 **Avner Peleg** (The Hebrew University of Jerusalem)  
Coupled nonlinear Schrödinger equations with dissipative terms and control of soliton propagation in broadband optical waveguide systems

18:30 - 20:30 Reception at IIAS Foyer

### Monday, 13 July

09:00 - 10:00 **Jean Zinn-Justin** (Irfu Center de Saclay)  
The imaginary cubic perturbation revisited: the power of summation methods

10:00 - 10:30 **Philipp Ambichl** (Vienna University of Technology)  
Constant-intensity waves in non-Hermitian potentials

10:30 - 11:00 **Jörg Doppler** (Vienna University of Technology)  
General description of quasi-adiabatic dynamical phenomena near exceptional points

11:00 - 11:30 Coffee Break

11:30 - 12:30 **Avadh Saxena** (CNLS - Center for Nonlinear Studies, LANL)  
PT-Symmetric Kagome Lattices and Nonequilibrium Work

12:30 - 14:30 Lunch

14:30 - 15:30 **Boris Malomed** (Tel Aviv University)  
PT symmetry in optics beyond the paraxial approximation

- 15:30 - 16:30 **Igor V. Barashenkov** (University of Cape Town)  
Nonlinear Schrodinger dimer with gain and loss:  
Hamiltonian structure, transition softening, and  
spontaneous PT -symmetry restoration
- 16:30 - 17:00 Coffee Break
- 17:00 - 18:00 **Philip Mannheim** (University of Connecticut)  
Advancing the case for PT Symmetry -- the  
Hamiltonian is always PT Symmetric
- 18:00 - 19:00 **Qinghai Wang** (National University of Singapore)  
Spectra of Hamiltonians with PT-symmetric  
polynomial potentials

## Tuesday, 14 July

- 09:00 - 10:00 **Günther Wunner** (University of Stuttgart)  
Resonances in scattering at third-order exceptional  
points
- 10:00 - 11:00 **Holger Cartarius** (University of Stuttgart)  
A coupling approach to realize a PT-symmetric  
potential for a Bose-Einstein condensate
- 11:00 - 11:30 Coffee Break
- 11:30 - 12:30 **Frederik George Scholtz** (National Institute for  
Theoretical Physics (NITheP))  
Non-commutativity and other applications of exact  
renormalisation  
group dualities
- 12:30 - 14:30 Lunch
- 14:30 - 15:30 **Naomichi Hatano** (University of Tokyo)  
Two methods of numerically computing the  
inverse localization length in one dimension

- 15:30 - 16:30 **Sergii Kuzhel** (AGH University of Science and Technology)  
On the theory of C-symmetries
- 16:30 - 17:00 Coffee Break
- 17:00 - 18:00 **Eva-Maria Graefe** (Imperial College London )  
Exploring new random matrix ensembles for PT-symmetric quantum systems
- 18:00 - 19:00 **Dorje Brody** (Brunel University London)  
PT-symmetric quantum mechanics in finite dimensions
- 19:30 - 21:30 Dinner

### Wednesday, 15 July

- 09:00 - 10:00 **A. Douglas Stone** (Yale University)  
Why the Laser Linewidth is so Narrow: Insights from Non-Hermitian Physics
- 10:00 - 10:30 **Adi Pick** (Harvard University)  
Ab-initio theory of emission spectra from gain media
- 10:30 - 11:00 Coffee Break
- 11:00 - 12:00 **Yogesh Narayan Joglekar** (Indiana University-Purdue University, Indianapolis)  
PT systems with temporal or spatial periodicity
- 12:00 - 12:30 **Frantisek Ruzicka** (Academy of sciences of the Czech Republic)  
Pseudospectra in pseudo-hermitian quantum mechanics

- 12:30 - 13:30    **Joshua Feinberg** (Haifa University & The Technion)  
Quasi-Hermitian Random Matrix Theory
- 13:30 - 14:30    Light Lunch (sandwiches will be provided at the lobby of the lecture hall)
- 15:00 - 20:00    Excursion

**Thursday, 16 July**

- 09:00 - 10:00    **Tsampikos Kottos** (Wesleyan University, Middletown)  
Non-Hermitian Optical Structures with Losses
- 10:00 - 11:00    **Boris Shapiro** (Technion, Israel Institute of Technology)  
PT-symmetry in macroscopic magnetic structures
- 11:00 - 11:30    Coffee Break
- 11:30 - 12:30    **Andreas Fring** (City University London)  
A unifying E2-quasi exactly solvable model
- 12:30 - 14:30    Lunch
- 14:30 - 15:00    **Gal Harari** (Technion, Israel Institute of Technology)  
Topological insulators in PT-symmetric lattices
- 15:00 - 16:00    **Miloslav Znojil** (Academy of sciences of the Czech Republic)  
Quantum Big Bang/Crunch in a simplified scenario
- 16:00 - 16:30    Coffee Break
- 16:30 - 17:30    summary and farewell