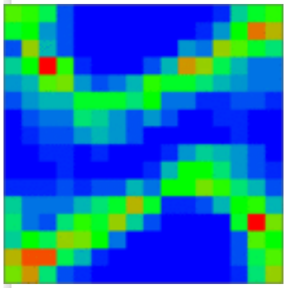
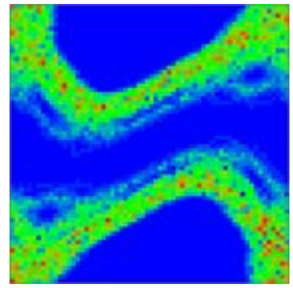
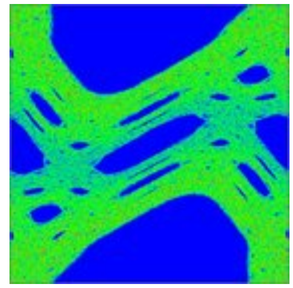
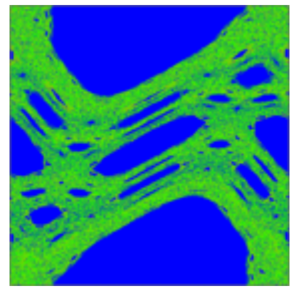
Category:Quantum chaos









Quantum Chaos emerged as a new field of physics from the efforts to understand the properties of quantum systems which have chaotic deterministic dynamics in the classical limit. Such classical dynamics in a bounded phase space is characterized by a continuous spectrum of motion and exponential instability of trajectories and belongs to the Category Chaos in Dynamical systems. In contrast the corresponding quantum systems have a discrete spectrum and are usually stable in respect to small perturbations. In spite of these differences the ***correspondence principle of Niels Bohr*** guaranties that the quantum evolution follows the classical chaotic dynamics during a certain time scale which becomes larger and larger when the dimensionless ***Planck constant*** goes to zero (see Figures). Also the ***Ehrenfest theorem*** states that a narrow wave packet follows closely even a chaotic trajectory. However, due to the exponential instability of chaotic dynamics a wave packet spreading is exponentially fast and the ***Ehrenfest time*** on which the theorem is valid becomes logarithmically short. The problem of semiclassical quantization of such quantum systems had been pointed out by ***Albert Einstein*** already in 1917 but it found its solution only at the end of the century. *What happens beyond the Ehrenfest time? What are the properties of quantum states in this regime?* The answers on these and other questions can be found in this Category.

Quantum Chaos finds applications in number theory, fractal and complex spectra, atomic and molecular physics, clusters and nuclei, quantum transport on small scales, mesoscopic solid-state systems, wave propagation, acoustics, quantum computers and other areas of physics. It has close links with the Random Matrix Theory, invented by ***Wigner*** for a description of spectra of complex atoms and nuclei, interacting quantum many-body systems, quantum systems with disorder, quantum complexity of large matrices.

Pages in category "Quantum chaos"

The following 29 pages are in this category, out of 29 total.

- Cold atom experiments in quantum chaos

M

- Microwave ionization of hydrogen atoms

D

- Dissipative quantum chaos

F

- Field theory of quantum chaos

M

- Mesoscopic transport and quantum chaos
- Microwave billiards and quantum chaos

Q

- Quantized baker map
- Quantum chaos
- Quantum chaotic scattering
- Shnirelman theorem
- Spectral properties of quantum diffusion
- Supercondicting billiards and quantum chaos

Categories: Chaos | Physics | Quantum Mechanics | Dynamical Systems

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