

Universal Behavior of Quantum Chaotic Gas

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We discover numerically that a moving wave packet in a chaotic billiard will always evolve into a quantum state, whose density probability distribution is exponential. This exponential distribution is found to be universal for quantum chaotic systems with rigorous proof. In contrast, for the corresponding classical system, the distribution is Gaussian. We find that the quantum exponential distribution can smoothly change to the classical Gaussian distribution with coarse graining. This universal dynamical behavior can be observed experimentally with Bose-Einstein condensates.

Reference:

H. W. Xiong and B. Wu, *Laser Phys. Lett.* **8**, 398 (2011).