Stellingen

belonging to the thesis

“Study of a stroboscopic model of a quantum dot”

1. The Fast Fourier Transform algorithm can greatly speed up the calculation of the transmission matrix of the quantum kicked rotator.

Chapter 2.

2. Experiments and computer simulations that attempt to study the quantum-to-classical crossover in a quantum dot by varying the dwell time rather than the Ehrenfest time, are doomed to fail.

Chapter 4.

3. The exponential suppression of the weak localization effect in a quantum dot when the Ehrenfest time exceeds the dwell time, predicted in the literature, does not exist.

Chapter 5.

4. Unlike the current noise, the electromechanical force noise in a point contact does not vanish on the plateaus of quantized conductance.

Chapter 6.

5. Coherent backscattering from a quantum dot is insensitive to the Ehrenfest time.

6. A periodically time dependent potential in a single-channel conductor can produce spin entangled electron-hole pairs with an optimal efficiency of one Bell pair per two cycles.

7. A white-noise time dependent potential mimics the effects of dephasing on weak localization but not on shot noise.

8. A magnetic field shifts the excitation gap in an Andreev billiard to lower values by an amount which is independent of the Ehrenfest time.

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