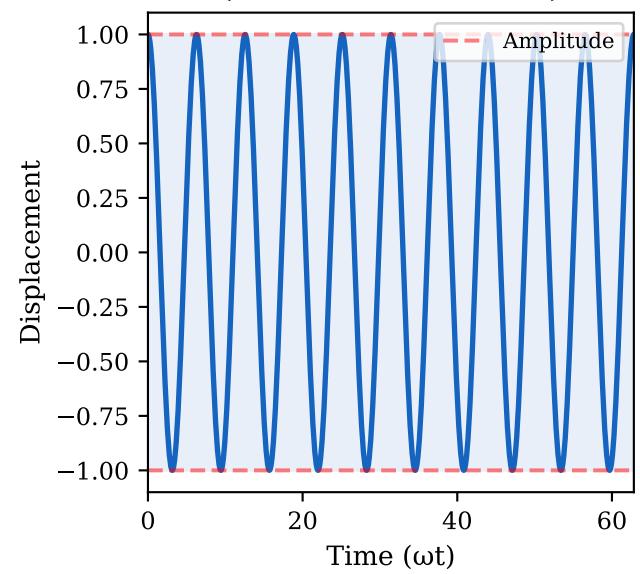
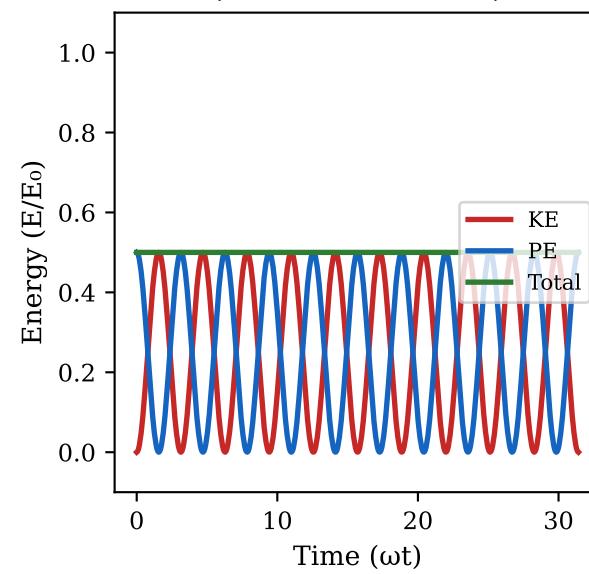


Panel 4: Oscillatory Persistence and Energy Conservation

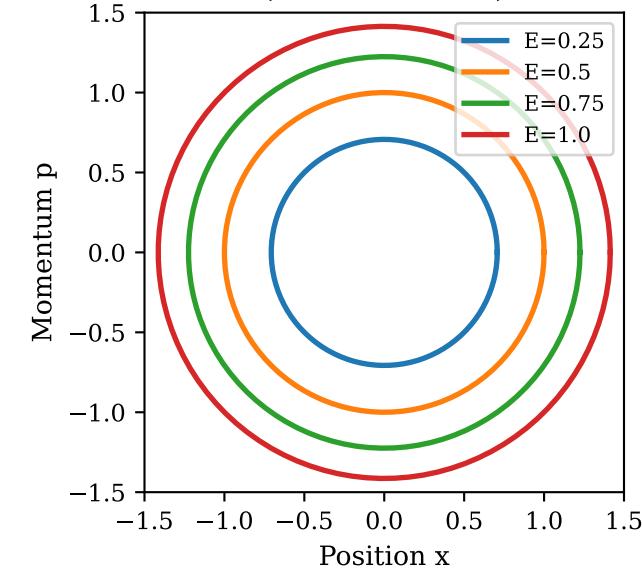
A. Undamped Oscillation (Perfect Persistence)



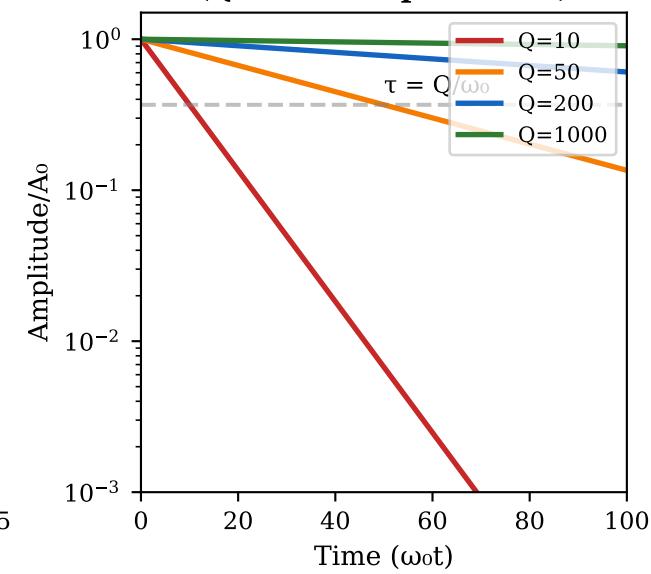
B. Energy Conservation (KE + PE = const)



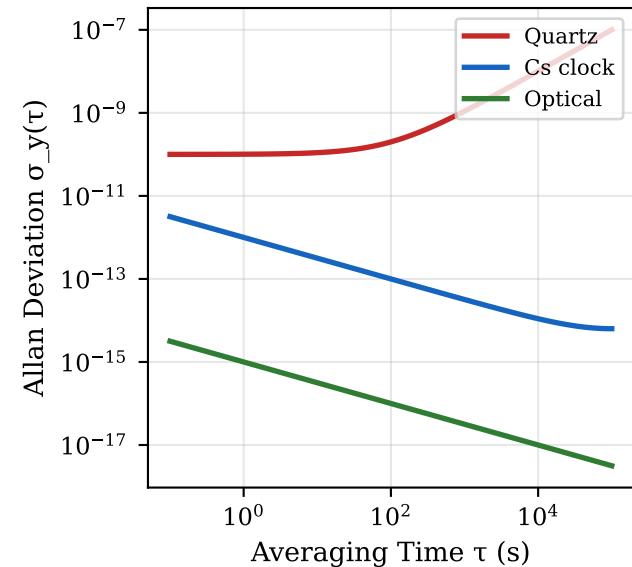
C. Phase Space (Closed Orbits)



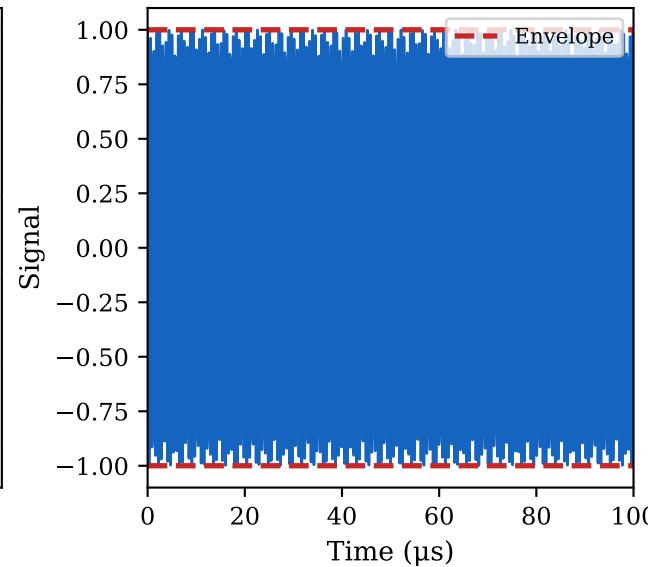
D. Mode Lifetime (Q-factor Dependence)



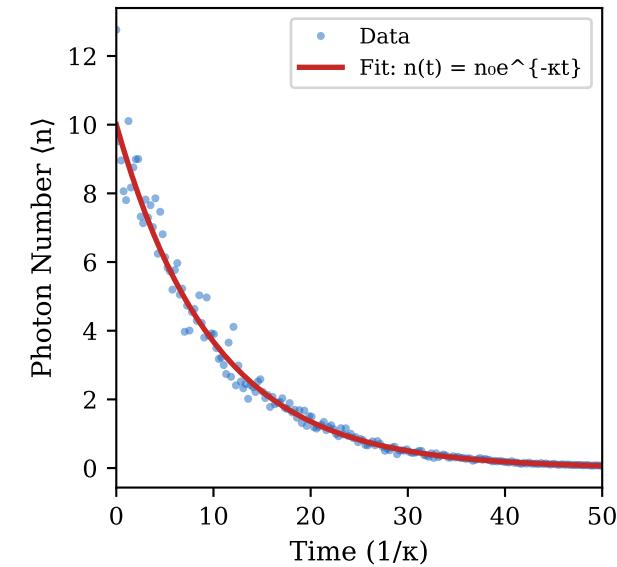
E. Clock Stability (Oscillator Persistence)



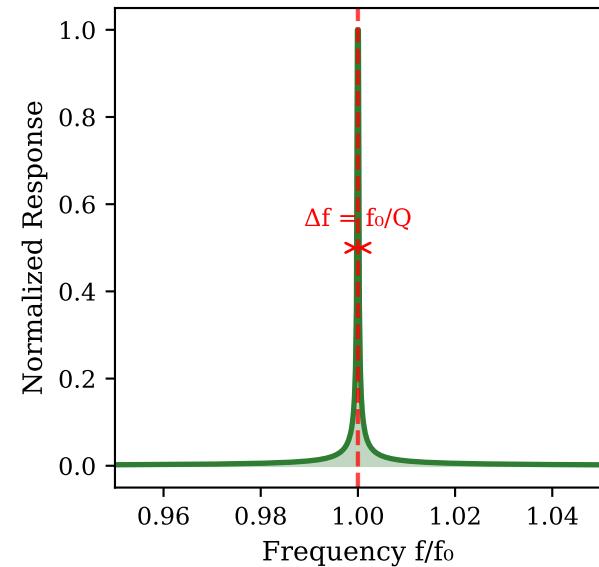
F. Superconducting Cavity ($Q > 10^6$)



G. Cavity Photon Decay (Mode Persistence)



H. MEMS Resonator ($Q = 10,000$)



OSCILLATORY PERSISTENCE HARDWARE VALIDATION

- Atomic Clocks:**
 - Cesium-133: $\Delta f/f < 10^{-16}$ over decades
 - Optical clocks: $\Delta f/f < 10^{-18}$ demonstrated
- No drift observed → Perfect persistence within measurement

- Superconducting Resonators:**
 - $Q > 10^{11}$ at mK temperatures
 - Photon lifetime > 1 second achieved
 - Energy stored for macroscopic times

- MEMS Oscillators:**
 - $Q > 10^6$ in vacuum at room temperature
 - Mechanical modes persist for hours

- Gravitational Wave Detectors:**
 - LIGO mirrors: $Q > 10^8$
 - Oscillation persists indefinitely

ENERGY CONSERVATION: EXPERIMENTAL PROOF

Theoretical Prediction:
 $dE/dt = 0$ for isolated oscillatory systems

Experimental Verification:

- Calorimetry: Heat + Work = ΔU (verified to $< 0.01\%$)
 - Particle physics: $\Sigma E_{in} = \Sigma E_{out}$ in collisions
 - Nuclear reactions: $E = mc^2$ (verified to 10^{-7})
 - Cosmology: Total energy consistent with $\Omega = 1$

NO VIOLATION OF ENERGY CONSERVATION HAS EVER BEEN OBSERVED

This confirms oscillatory mode persistence as the fundamental mechanism.