

Experimental Protocols for Validating Quantum-Harmonic Frameworks

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Purpose - Provide lab-ready, step-by-step experimental designs that can be executed today

0 . Road-Map Snapshot

Expt #	Goal	Core Phenomenon	Headline
1	Long-range resonant wireless power	Inductive + capacitive coupling	$\geq 40\text{W}$
2	Battery-free desk-lamp demo	Continuous resonant field powering	$\geq 24\text{h}$
3	Macroscopic levitation	Quadrupole harmonic EM trap	Stable
4	Local g-field modulation	Rotating HF + cryogenic superconductor	$\Delta g \geq 5\%$
5	Picosecond temporal dilation	Dual optical-lattice clocks	$\Delta f/f \geq 10\%$

1 . Five-Metre Resonant Wireless Power Link

1.1 Materials & BOM

Qty	Part	Spec / Notes	Vendor
2	Copper spiral coil	40cm Ø × 8 turn, AWG#10 litz	Custom/Tesla K
2	High-Q polypropylene capacitor	200nF @ 1kV	CDE 942C series
1	Class-E RF power amplifier	13.56MHz, 150W	MOSFET kit
1	Signal generator	1-20MHz DDS	Any lab gen
2	Optically-isolated power meters	0-500W RF & DC	Bird Thruline
1	Oscilloscope	$\geq 200\text{MHz}$, 4GS/s	Keysight DSOX
Misc PVC standoffs, SMA cables, IR thermometer, vent fan			

1.2 Build & Tune

- Wind coils, measure $L \approx 2.1\mu\text{H}$
- Tank C = 200nF $\rightarrow f \approx 13.56\text{MHz}$
- Mount coils coaxially, 5m apart
- Drive primary via Class-E amp; verify $Z \approx 0$

1.3 Calibration - Sweep 12-16MHz on VNA; tune C for peak |S| at 13.560 $\pm 0.002\text{MHz}$

1.4 Run & Record - 80W RF input; log DC load, coil temps ($< 65^\circ\text{C}$)

1.5 Expected - 40-50W delivered, $\eta \approx 55\%-60\%$; detune 100kHz $\rightarrow \eta$ drops $> 90\%$

1.6 RedFlags - $\eta < 30\% \rightarrow$ re-tune; watch V_DS $< 240\text{V}$

2 . Battery-Free Desk-Lamp (24h)

Transmitter: 20cm coil @ 6.78MHz ISM

Receiver: 10cm PCB spiral, LT4320, 50F supercap

Load: 12V / 2A LED

Procedure - Place 1.5m away, drive 30W RF, MQTT log cap V every 5min

Expected - Cap to 13V in 15min; droop $< 0.2\text{V}$ over 24h

3 . Harmonic Quadrupole Levitation

Materials - 4 Cu coils (500turn, R=5cm), 4x1kW amps, DSP source, 5g Al puck, laser r

Procedure - Quadrupole field, $\omega = 2\pi \cdot 120\text{Hz}$, $B \leq 0.6\text{T}$

Expected - 10mm levitation $\geq 30\text{s}$; coil FFT clean ($\leq -40\text{dBc}$)

4 · Local Gravity Modulation

HTS YBCO ring $\varnothing=15\text{ cm}$ @ 77 K , 3000 rpm ; laser gravimeter 2 m away
Expected - $\Delta g = 5-15\text{ }\mu\text{Gal}$ synchronous with spin ($\geq 3\sigma$)

5 · Resonant Temporal Dilation (Optical Clocks)

Setup - Twin ^{138}Yb lattice clocks; one inside 40 cm cavity @ 9.2 GHz , 2 kW
Expected - $\Delta f/f \geq 1\times 10^{-1}$ over 12 h

Appendix - Data logging (Pi \times 5 + GPSDO), IPFS hash; Safety (ICNIRP \times 2020, cryo PPE)