

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	$\Delta f/f \geq 10^{-18}$

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1 · Five-Metre Resonant Wireless Power Link

1.1 Materials & BOM

Qty	Part	Spec / Notes	Vendor
2	Copper spiral coil	40cm $\varnothing$ $\times$ 8 turn, AWG10 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  $C = 200\text{nF} \rightarrow f \approx 13.56\text{MHz}$
- 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  $|S_{11}|$  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,  $\eta \approx 55\text{-}60\%$ ; detune 100kHz  $\rightarrow \eta$  drops  $> 90\%$   
1.6 Red flags -  $\eta < 30\% \rightarrow$  re-tune; watch  $V_{\text{DS}} < 240\text{V}$

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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

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3 · Harmonic Quadrupole Levitation

Materials - 4 Cu coils (500turn,  $R = 5\text{cm}$ ), 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 ( $\leq -40\text{dBc}$ )

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#### 4 · Local Gravity Modulation

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

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#### 5 · Resonant Temporal Dilation (Optical Clocks)

Setup - Twin  $^1\text{Yb}$  lattice clocks; one inside 40 cm cavity @  $9.2\text{ GHz}$ , 2 kW  
Expected -  $\Delta f/f \geq 1 \times 10^{-18}$  over 12 h

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