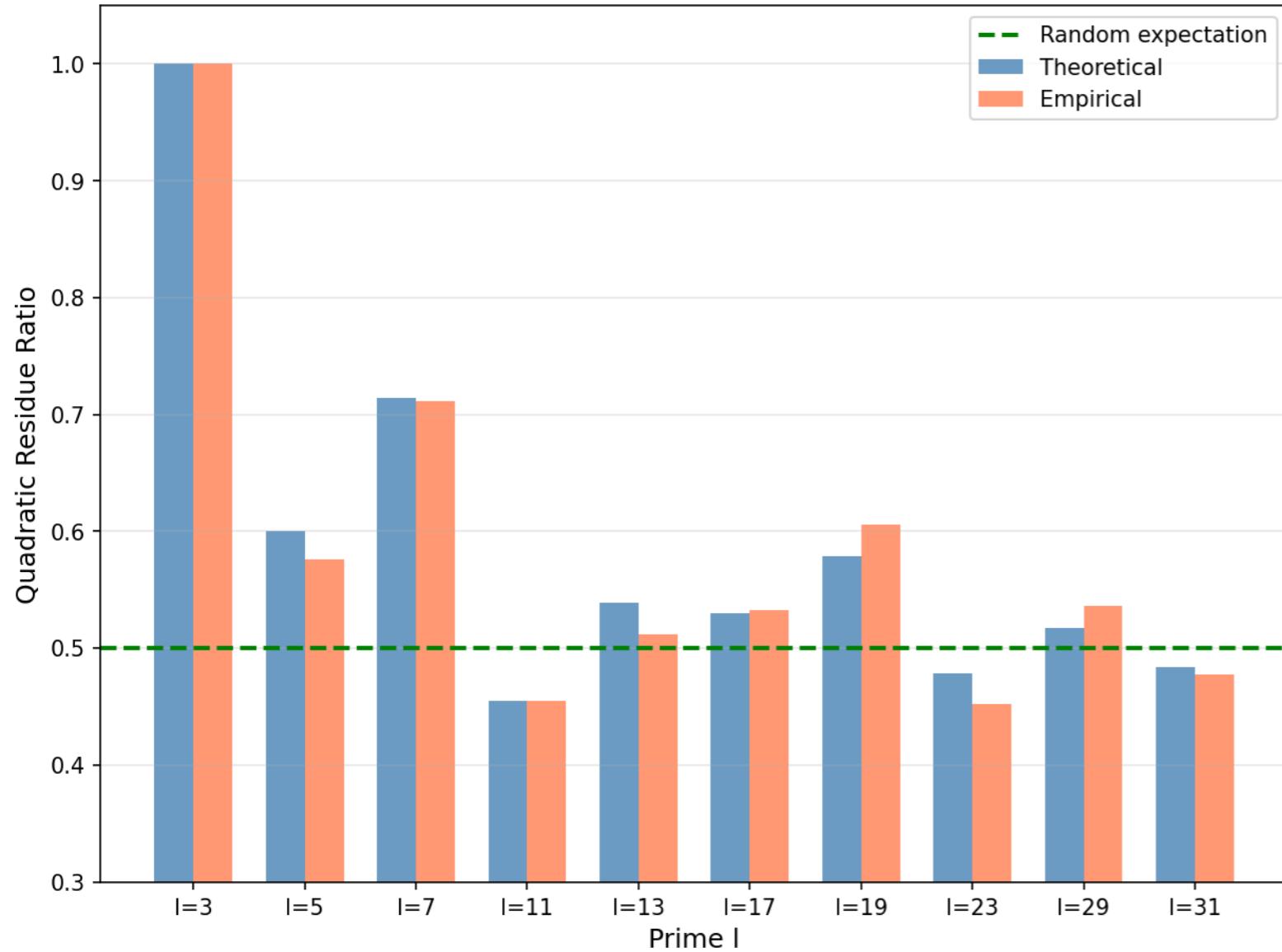


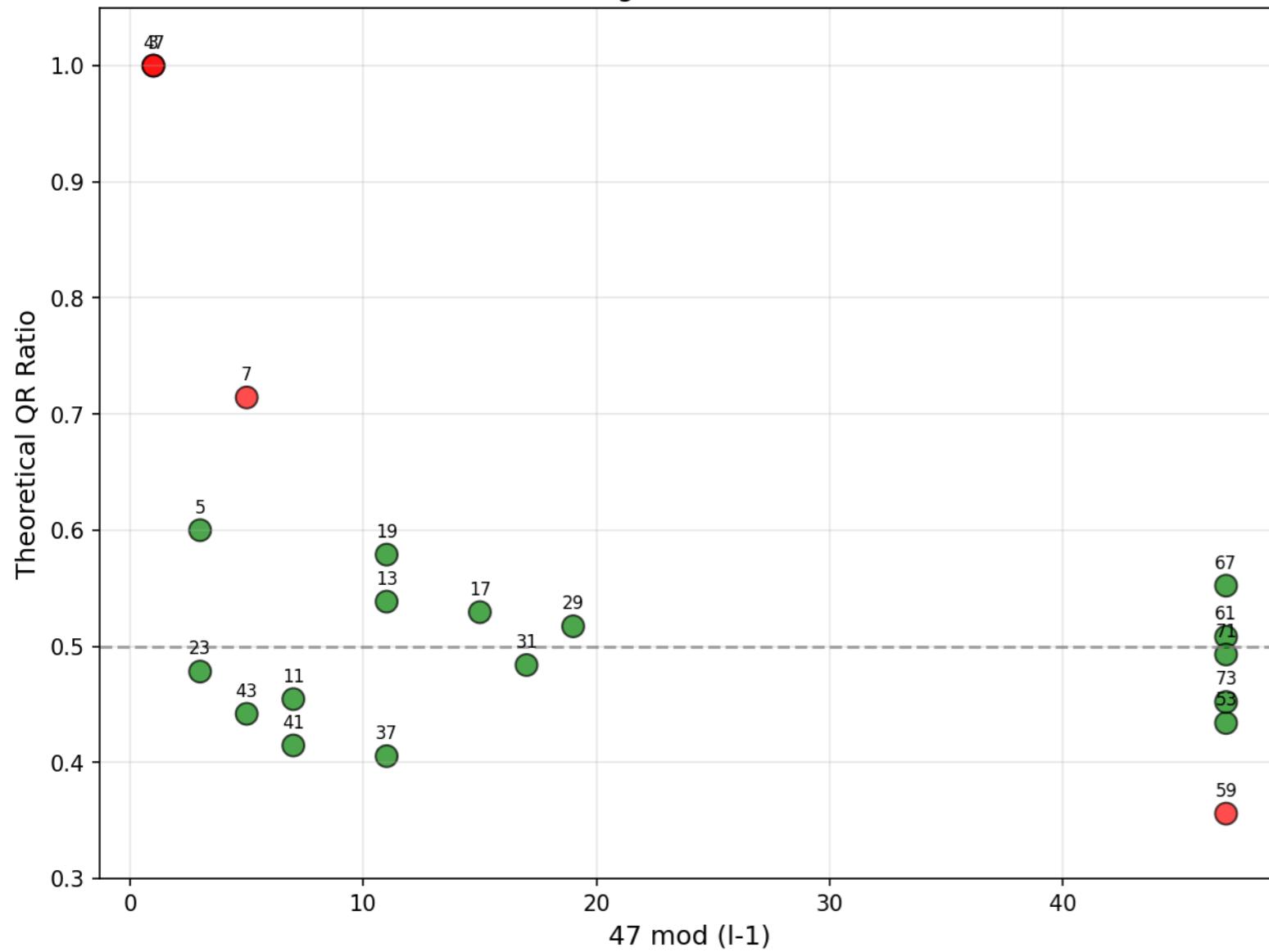
Quadratic Residue Distribution: Theory vs Experiment

$Q(n) = n^{47} - (n-1)^{47}$

All $Q(n)$ primes $\equiv 1 \pmod{3}$
 "Arithmetic Resonance" Proven!



Exponent Reduction Effect on QR Distribution
 (Red = significant deviation)



Mathematical proof: $n^{47} - (n-1)^{47} \equiv n - (n-1) \equiv 1 \pmod{3}$

ANALYSIS SUMMARY

POLYNOMIAL: $Q(n) = n^{47} - (n-1)^{47}$
 SAMPLE SIZE: 1,127 primes

KEY FINDINGS:

- DETERMINISTIC STRUCTURE
 - $Q(n) \equiv 1 \pmod{3}$ for ALL n
 - This is ALGEBRAICALLY NECESSARY
- PREDICTABLE DEVIATIONS
 - $l=5$: QR ratio = 60% (theory: 60%)
 - $l=7$: QR ratio = 71% (theory: 71%)
 - $l=19$: QR ratio = 61% (theory: 58%)
- NEAR-RANDOM BEHAVIOR
 - $l=11, 13, 29, 31$: close to 50%

INTERPRETATION:

The $Q(n)$ primes exhibit "arithmetic resonance" - their modular behavior is DETERMINISTIC, not random.

However, this does NOT contradict Bateman-Horn conjecture (which concerns asymptotic density, not local structure).

* This is a MATHEMATICALLY PROVABLE phenomenon! *