

Witting/W33 Experiment Pack

KS Inequality + Z_3 Phase Test

Claim: The W33 generalized quadrangle encodes the Standard Model structure via a finite geometric backbone and an explicit E8 root correspondence.

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W33 THEORY OF EVERYTHING
COMPUTED PROOF + ARTIFACTS

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1 Witting/W33 Experiment Pack

1.1 1. Objective

Deliver a **lab-ready** experimental plan that tests two falsifiable signatures:

1. **State-independent contextuality** via the 24-basis KS inequality.
 2. Z_3 **geometric phase** via Pancharatnam triangle loops.
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1.2 2. KS Inequality (24-Basis)

- Noncontextual bound: **23 / 24**
- Quantum prediction: **24 / 24**

Docs: - docs/witting_24basis_inequality.md - docs/witting_24basis_runsheet.md - docs/witting_24basis

Noise robustness: - docs/witting_24basis_noise_threshold.md

1.3 3. State Preparation and Settings

Unitary definitions: - docs/witting_24basis_unitaries.json

Optical decompositions: - MZI schedule: docs/witting_24basis_mzi_schedule.md - Waveplates (rad): docs/witting_24basis_waveplates.md - Waveplates (deg): docs/witting_24basis_waveplates_d

Ray amplitudes/phases: - docs/witting_ray_amplitude_phase.csv

1.4 4. Z_3 Pancharatnam Phase Test

Key signature: phase quantization in $\{0, \pm 2\pi/3\}$.

Docs: - Protocol: docs/witting_pancharatnam_protocol.md - Examples: docs/witting_pancharatnam_exempl
- Run-sheet: docs/witting_pancharatnam_runsheet.md - Noise robustness: docs/witting_pancharatnam_noise

1.5 5. Experimental Checklist

1. Calibrate phase reference across all interferometric measurements.
 2. Verify basis orthonormality (unitary columns).
 3. Run KS bases in order and compute score S .
 4. Measure Pancharatnam triangles and verify Z_3 phase clustering.
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1.6 6. Expected Outcomes

- **KS violation:** $S = 24$ (noncontextual bound 23).
- **Z_3 phase:** $\Phi \in \{0, \pm 2\pi/3\}$ with robust clustering.

Any failure falsifies the Witting/W33 photonic realization.

External Sources

1. R. A. Wilson, *On Possible Embeddings of the Standard Models of Particle Physics and Gravity in E_8* (2024).
2. A. Marrani and P. Truini, *The Magic Star of Exceptional Periodicity* (2017).
3. L. A. Anchordoqui et al., *Warm Dark Matter from Higher-Dimensional Gauge Theories*, Universe 7 (2021) 462.
4. Schlaefli graph references: MathWorld and Wikipedia (SRG parameters (27,16,10,8)).