

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.

January 28, 2026

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 - Wave-plates (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_examples - 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)).