Discrete Electric Charge as a Topological Invariant of Source-Free Maxwell Fields

Abstract (<=120 words)

State that a pair of integer windings $Q = (n_1, n_2) \in \pi_1(T^2) \cong \mathbb{Z}^2$ reproduces the observed discreteness of electron charge without sources: each winding contributes a fixed flux quantum; stable field lines force integer multiples. Quantised Coulomb energy emerges from mode geometry, not from Gauss-law sources.

Skeleton

1. **Motivation** – experimental charge quantisation; limitations of source-based explanations.
2. **Geometry of a toroidal vacuum mode** – radii (R, r), harmonic forms, definition of Q.
3. **Topological theorem** – smooth Maxwell evolution preserves Q; sketch homotopy proof.
4. **Flux quantisation** – each unit of Q carries flux Φ_0; derive from Stokes + single-valued vector potential.
5. **Mapping to the electron** – match Φ_0 with α (fine-structure) to fix R/r.
6. **Observable predictions** – (i) half-integer anomalies forbidden; (ii) allowed annihilation channels require $\Delta Q = 0$; list spectroscopic tests.
7. **Discussion** – relation to Dirac monopole quantisation and θ-vacua; why no free parameters remain.

Notes

- Keep "light-based metric" as a practical ruler only; emphasise metric-free statements of observables.
- Cite prior "energy–energy attraction" derivation and clearly state when that argument is reused.
- Append detailed proofs or numerical code; main text stays lean, ~6–8 pages each.

These outlines isolate the two messages you want: **(I) charge quantisation from topology, (II) inverse-square attraction from energy**, making the conceptual difference unmistakable.

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