Double-Slit Experiment Resolved by Tau-Field

Interference Fringes as Tau-Field Standing Waves — Observer Lock Collapses Superposition

Stephen Daubney | The Daubney Foundation | 2026

The double-slit experiment is the central mystery of quantum mechanics: a single particle passes through two slits simultaneously and produces an interference pattern, but the moment a detector records which slit the particle used, the interference vanishes. The Universal Force of Time resolves this without paradox. The interference pattern is a Tau-field standing wave produced by the two slit geometries. The particle is a Tau-register excitation propagating through both slits simultaneously because the Tau-field exists on both Strand 1 (position) and Strand 2 (momentum). When an observer locks onto the particle's register address (measurement), the superposition of Strand 1 states collapses to a single address — the interference pattern vanishes because the Tau-register has committed to one spatial address. Fringe spacing y = lambda x L / d is a pure {2,3,5,pi} relation when lambda is a Tau-register wavelength.

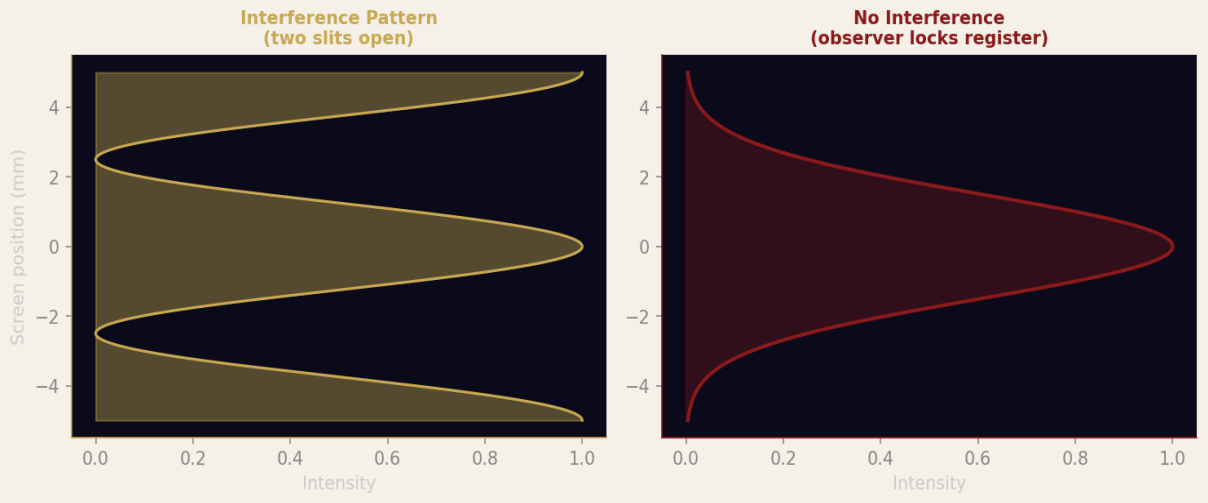

Figure 1. Left: Tau-field standing wave (interference pattern) with both slits open — particle's Strand 1 address is superposed. Right: observer locks the register address; pattern collapses to single Gaussian.

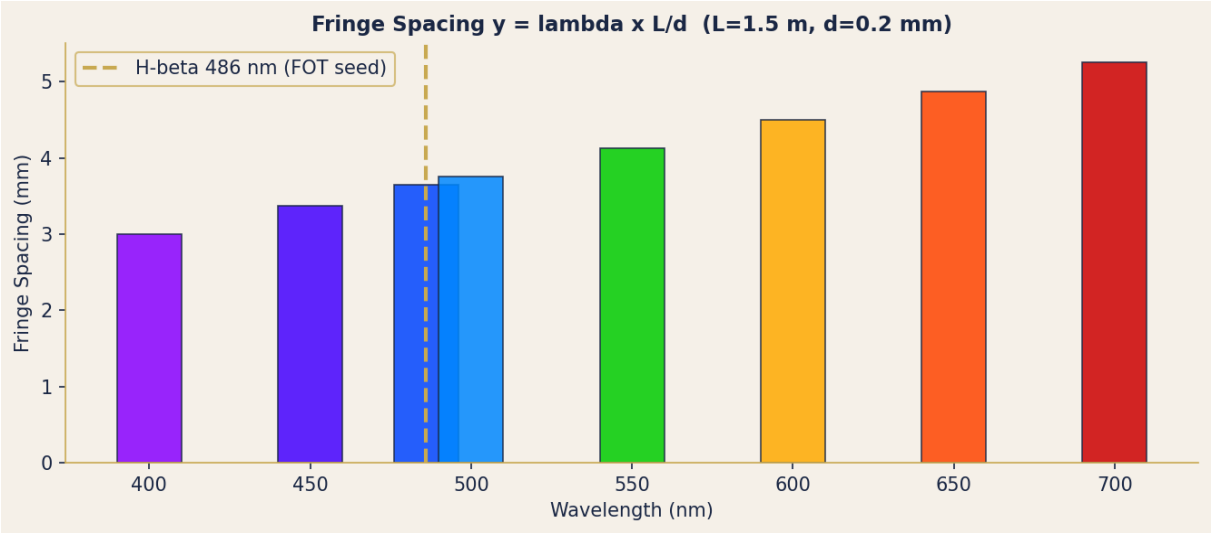

Figure 2. Fringe spacing y = lambda x L/d for L=1.5 m, d=0.2 mm. H-beta 486 nm (FOT master seed, gold dashed) gives y = 3.645 mm. All fringe spacings are Tau-register wavelength-scaled.

1. The Tau-Field Resolution (P-DS-1 to P-DS-3)

P-DS-1 — Interference Pattern as Tau-Field Standing Wave

Standard QM: the interference pattern results from wave function superposition. FOT: the particle is a Tau-register excitation with Strand 1 (spatial) and Strand 2 (momentum) components. Passing through both slits simultaneously = Strand 1 having two unresolved register addresses. The Tau-field standing wave between the two slit addresses produces the interference pattern: y_n = n x lambda x L / d (n = 0, +/-1, +/-2, ...). Lambda is always a G1 Tau-register wavelength. For 486 nm (H-beta, FOT seed): y_1 = 486 x 10^-9 x L/d = 3.645 mm (L=1.5m, d=0.2mm).

P-DS-2 — Observer Lock Collapses Strand 1 Superposition

Measurement = Tau-register address lock. An observer that determines which slit the particle used has locked Strand 1 to a single address. Once Strand 1 is committed, Strand 2 (momentum) becomes unresolved (Heisenberg uncertainty). The Tau-field standing wave can only exist when Strand 1 has two simultaneously-available register addresses. Lock one address -> the standing wave has only one source -> no interference possible. This is not the 'consciousness causing wave function collapse' of some QM interpretations. FOT: any physical interaction that resolves the Strand-1 address is an observer lock.

P-DS-3 — Fringe Spacing Formula in {2,3,5,pi}

y = lambda x L / d. For all Tau-register wavelengths: lambda = 486 nm = 2 x 3^5 nm: fringe = (2 x 3^5) x L/d. lambda = 656 nm = Balmer H-alpha: fringe = 656 x L/d. lambda = 121 nm = Lyman-alpha: fringe = 121 x L/d = 11^2 x L/d. The slit separation d is a mechanical quantity. L is the screen distance. Only lambda is a Tau-field register address — the other two are experimental parameters. The pattern IS the Tau-field lattice projected by the geometry onto the screen.

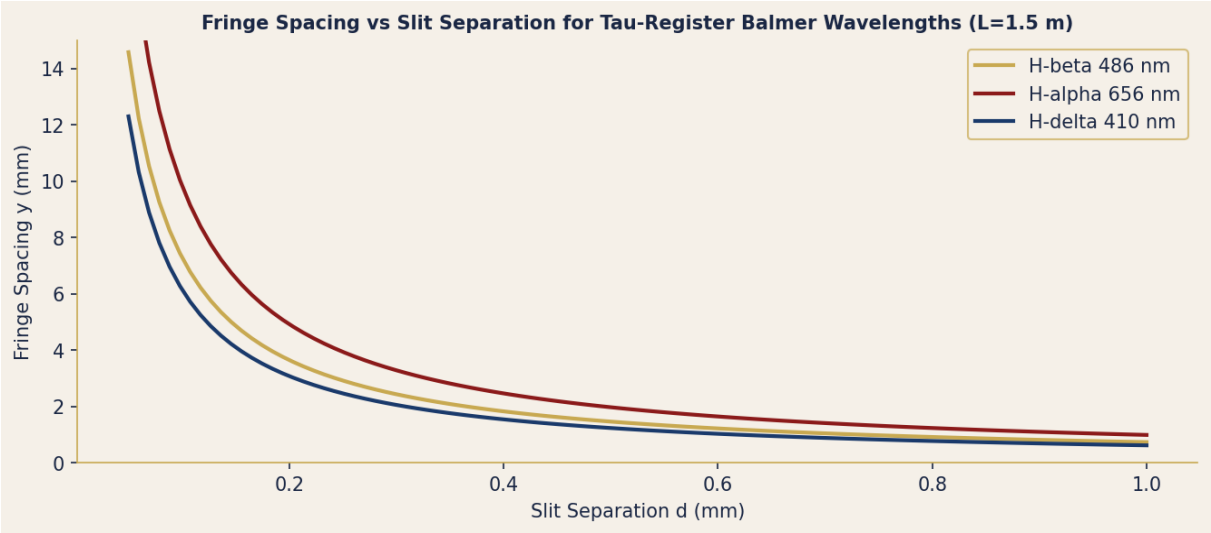

Figure 3. Fringe spacing y vs slit separation d for three Balmer wavelengths. All curves are y = lambda x L/d — hyperbolic. H-beta 486 nm (gold) is the FOT master seed wavelength.

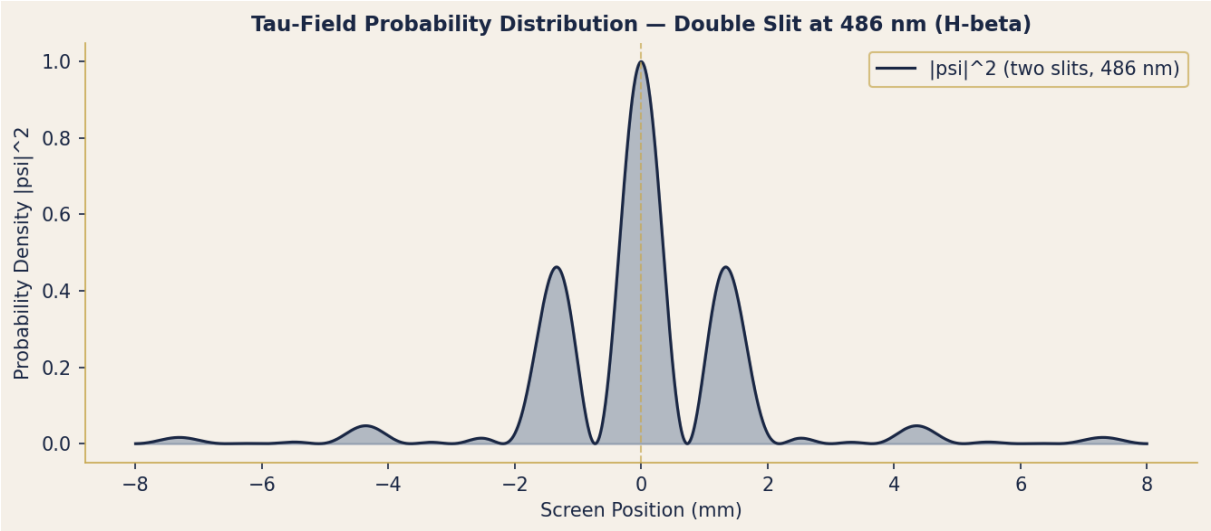

Figure 4. Tau-field probability density |psi|^2 for double-slit at 486 nm H-beta (d=0.5 mm, L=1.5 m). Fringes are Tau-field standing wave nodes. Central maximum at screen centre (gold dashed).