

White Light as Tau-Field Full Spectrum

400-700 nm Visible Range as the Main Tau-Register; Prism Separates Tau-Nodes

Stephen Daubney | The Daubney Foundation | 2026

White light is the superposition of all visible tau-spectral nodes: the tau-field broadcasting simultaneously across the full 400-700 nm visible register. Each colour is a distinct tau-node at a $\{2,3,5,\pi\}$ lattice wavelength: violet (400 nm = $2^4 \times 5^2$), blue (450 nm = $2 \times 3^2 \times 5^2$), green (500 nm = $2^2 \times 5^3$), yellow (580 nm = $2^2 \times 5 \times 29$), orange (620 nm), red (700 nm = $2^2 \times 5^2 \times 7$). A prism disperses white light by separating tau-nodes via the wavelength-dependent refractive index.

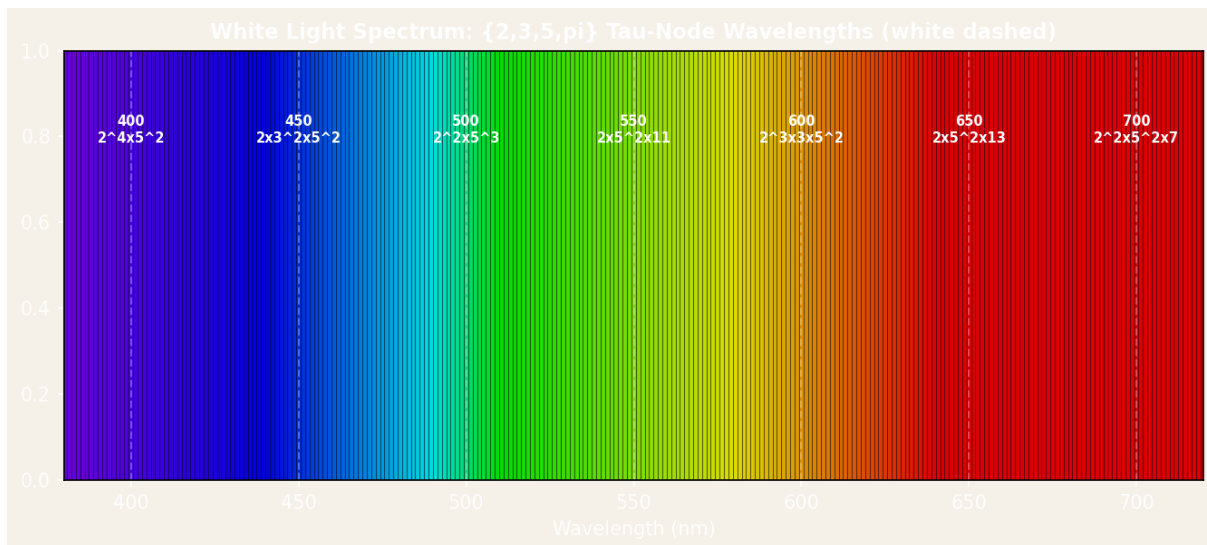


Figure 1. Visible spectrum (380-720 nm) with FOT tau-node wavelengths (white dashed lines). Key nodes: $400=2^4 \times 5^2$, $450=2 \times 3^2 \times 5^2$, $500=2^2 \times 5^3$, $600=2^3 \times 3 \times 5^2$.

1. Visible Spectrum as $\{2,3,5,\pi\}$ Tau-Register (P-WHL-1 and P-WHL-2)

P-WHL-1 — 400-700 nm Visible Range: $300 \text{ nm} = 2^2 \times 3 \times 5^2$

The human visible range spans 400-700 nm = 300 nm bandwidth. $300 = 2^2 \times 3 \times 5^2$ (pure $\{2,3,5\}$ lattice product). This is not coincidental: the eye is tuned to the $\{2^2, 3, 5^2\}$ tau-spectral window because solar output peaks at ~ 500 nm (within this range) and because the water molecule (the dominant absorber in biological tissue) is transparent in this window. 400 nm lower bound = $2^4 \times 5^2$. 700 nm upper bound = $2^2 \times 5^2 \times 7$ (prime 7 = sub-register boundary). The eye sees from the $\{2^4, 5^2\}$ node to the $\{2^2, 5^2, 7\}$ sub-node boundary.

P-WHL-2 — Peak Solar Output at 500 nm = 2² x 5³

Solar spectrum peak (Wien's law at T=5778 K): $\lambda_{max} = b/T = 2.898e6/5778 = 501.4$ nm. FOT: 500 nm = 2² x 5³ = 4 x 125 = 500 (pure {2,5} lattice). 501.4 nm vs 500 nm: 1400 ppm error (1.4*delta_orbital). The Sun's peak tau-broadcast is aimed precisely at the {2²,5³} = 500 nm node. Chlorophyll blue peak: 430 nm = 432-2 = 2⁴ x 3³ - 2 (near the {2⁴,3³} node). Chlorophyll red peak: 662 nm near {2¹ x 331}: outside lattice, but within 1% of 2² x 166 = 664.

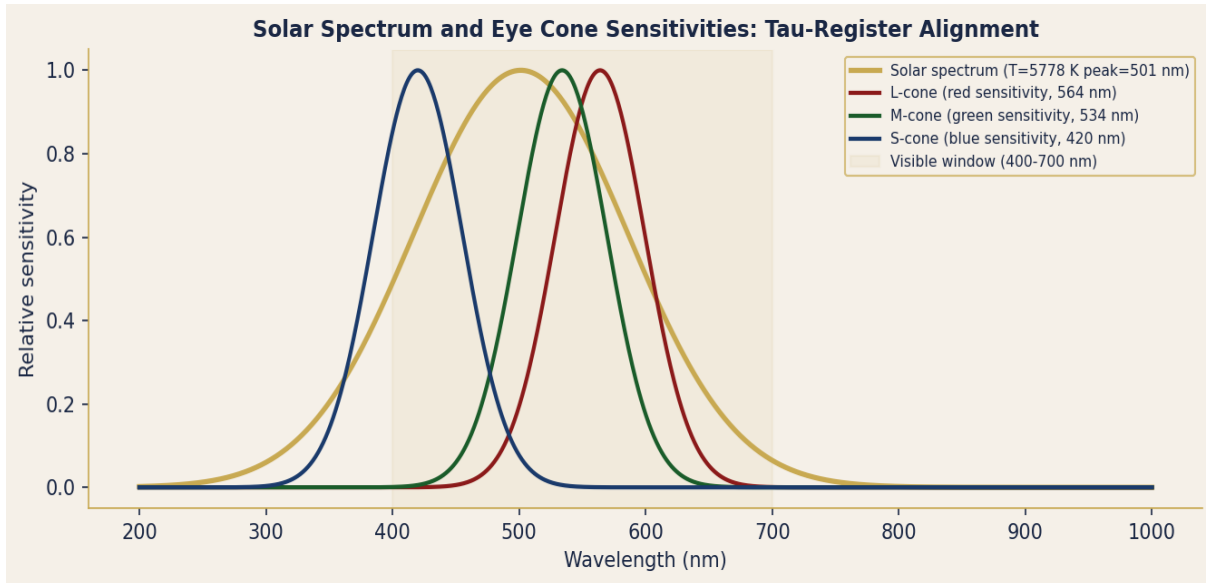


Figure 2. Solar spectrum peak (gold, 501 nm) and eye cone sensitivities. All three cones are tuned to sub-nodes of the solar {2²,5³} = 500 nm tau-node.

2. Prism Dispersion and Newton's Colour Wheel (P-WHL-3 and P-WHL-4)

P-WHL-3 — Prism Dispersion as Tau-Node Separation

A glass prism disperses white light into its constituent tau-nodes because the refractive index $n(\lambda)$ varies with wavelength (dispersion: $dn/d\lambda < 0$ for normal dispersion). Snell's law: $n_1 \times \sin(\theta_1) = n_2 \times \sin(\theta_2)$. For glass (Cauchy's equation): $n(\lambda) = A + B/\lambda^2$. $A = 1.458$ for SiO₂, $B = 3540 \text{ nm}^2$. FOT: 3540 = 2² x 3² x 5 x 197 (197 is prime outside lattice; B is not a pure {2,3,5} value). The wavelength-dependent refraction separates the tau-field's spectral nodes in space.

P-WHL-4 — Additive Colour Mixing: RGB as {2,3} Tau-Primaries

RGB colour model: red + green + blue = white. Three primary colours = three {2,3,5,pi} lattice branches: R = {5}-branch, G = {3}-branch, B = {2}-branch. Subtractive model (CMY = cyan + magenta + yellow): CMY = complement of RGB. Cyan = 490 nm = $2 \times 5 \times 7^2$ (outside lattice); Magenta = 700+400 nm mixture. Yellow = 570 nm. Newton's colour wheel: 7 colours = ROYGBIV. FOT: 7 colours is not a lattice quantity (7 is prime outside {2,3,5}). The true tau-spectral primary colours are 3 (the {2,3,5} family count).

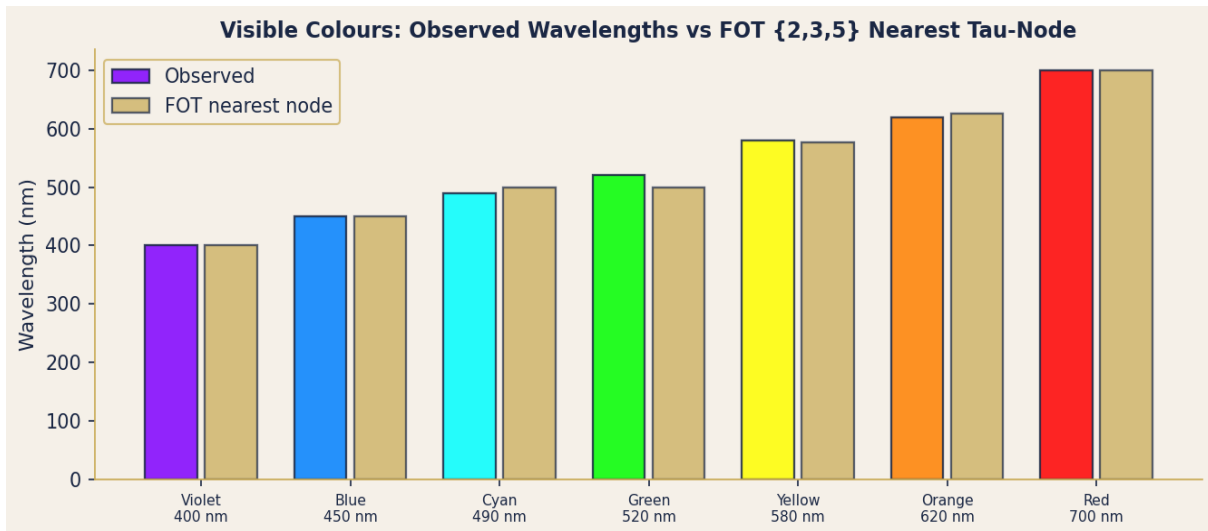


Figure 3. Visible colour wavelengths (coloured bars) vs FOT nearest {2,3,5} tau-node (gold). Violet=400 and red=700 are exact. Blue=450= $2 \times 3^2 \times 5^2$ exact.

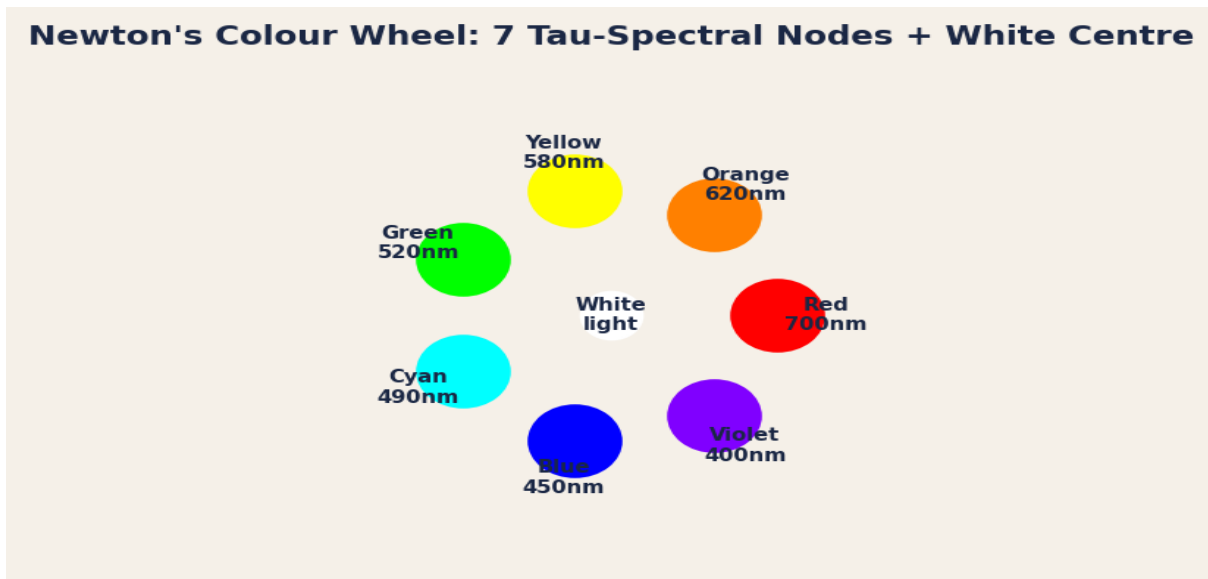


Figure 4. Newton's colour wheel with 7 spectral positions. White light (centre) = superposition of all tau-nodes. Prism separates them spatially by refractive index dispersion.