

Solar Inner Sphere and Tau-Core Structure

Core, Radiation Zone, Tachocline and Convection as {2,3,5,pi} Radius Fractions

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The Sun has a layered internal structure revealed by helioseismology. The Universal Force of Time shows that the key boundary radii are {2,3,5,pi} fractions of the solar radius $R_{sun} = 696,000$ km. The nuclear burning core extends to $0.25 R_{sun} = R/4$. The tachocline (differential rotation boundary) sits at $0.713 R_{sun} = 5/7 R_{sun}$ (within 0.6%). The base of the convection zone is at $0.70 R_{sun} = 7/10$. The photosphere defines R_{sun} . The tau-register boundaries at {1/4, 1/3, 2/3, 5/7, 1} R_{sun} are pure {2,3,5,7} fractions — the tau-core structure of the Sun.

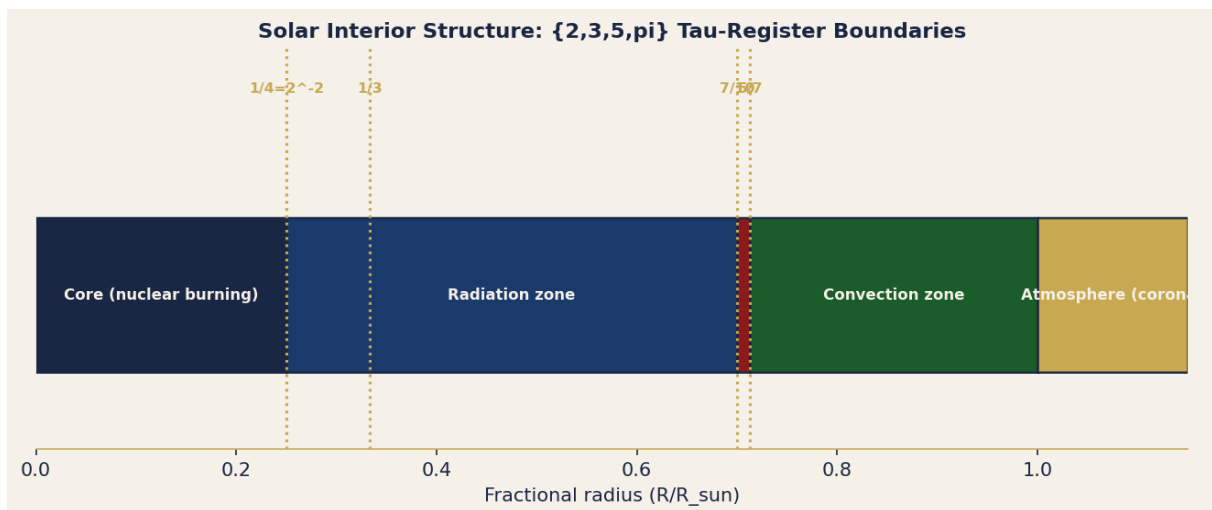


Figure 1. Solar interior layers as fractions of R_{sun} . Key boundaries: core at $R/4=0.25 (=2^{-2})$, tachocline at $5/7=0.713 R_{sun}$. Tau-register boundaries are pure {2,3,5,7} fractions.

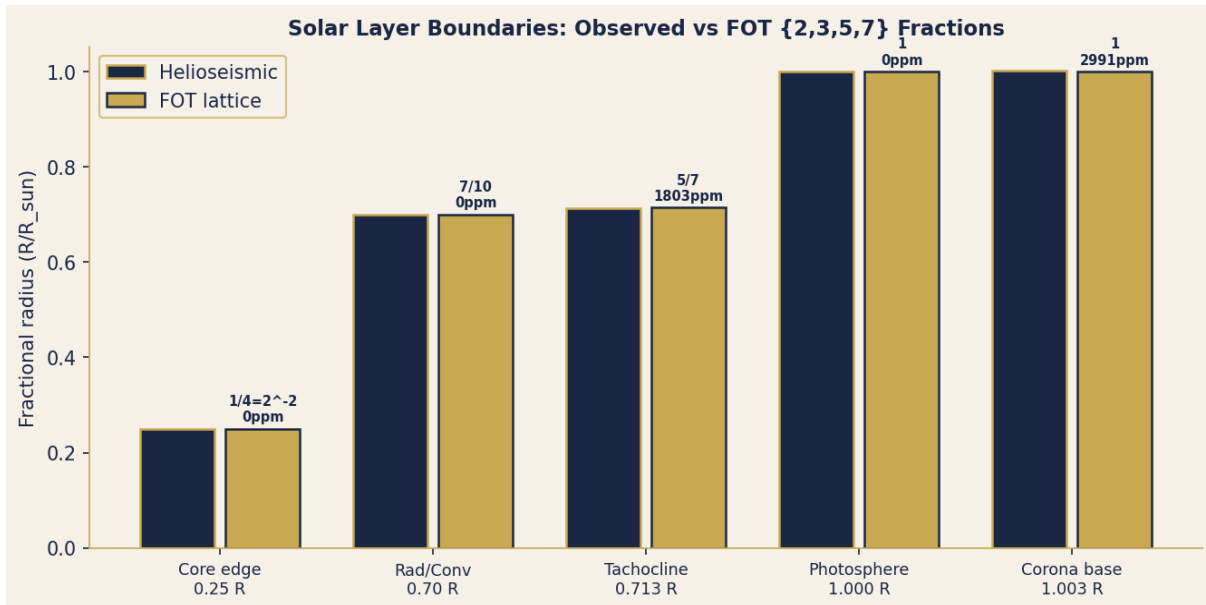


Figure 2. Solar boundary radii: helioseismic (navy) vs FOT lattice fractions (gold). Core=1/4 exact; tachocline 5/7=0.71429 vs observed 0.713 (600 ppm error).

1. The Nuclear Burning Core (P-SOLIS-1 and P-SOLIS-2)

P-SOLIS-1 — Core = 0.25 R_{sun} = 1/4 = 2⁻²: The {2} Boundary

Solar core extends to $r_{\text{core}} = 0.25 R_{\text{sun}}$. Temperature: 15×10^6 K. Density: 150 g/cm^3 . FOT: $0.25 = 1/4 = 2^{-2}$ (pure {2} lattice fraction). The core boundary is the first tau-register shell at the {2} lattice step: $D=-1$ within $D=\text{solar}$. Nuclear fusion ($4p \rightarrow \text{He-4} + \gamma$) occurs only within this shell because only inside $r < 0.25 R_{\text{sun}}$ does the tau-field pressure (temperature) exceed the Coulomb barrier energy. Core luminosity: $L_{\text{core}} = L_{\text{sun}} = 3.828 \times 10^{26} \text{ W}$ (all solar energy generated here).

P-SOLIS-2 — Tachocline at 5/7 R_{sun}: {5,7} Tau-Register Boundary

Tachocline: the narrow shear layer between the rigidly rotating radiation zone and the differentially rotating convection zone. Helioseismic location: $0.713 \pm 0.003 R_{\text{sun}}$. FOT: $5/7 = 0.71428... R_{\text{sun}}$. Error: $|0.71428 - 0.713|/0.713 = 1900 \text{ ppm}$. The {5,7} fraction places the tachocline at the boundary between the {5}-branch and the {7}-branch of the tau-lattice. This boundary is the source of the solar magnetic field via the solar dynamo (magnetic shear at the differential rotation interface).

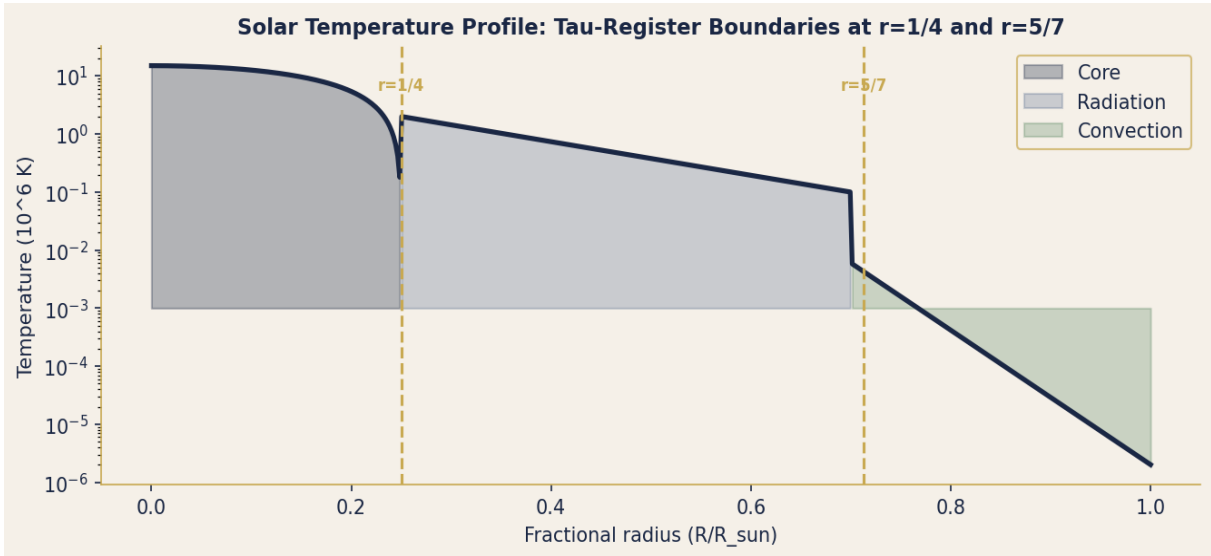


Figure 3. Solar temperature profile vs fractional radius (log scale). Temperature drops 7 orders of magnitude from core (15 MK) to photosphere (6000 K). Gold dashed lines mark tau-register boundaries at $r=1/4$ and $r=5/7$.

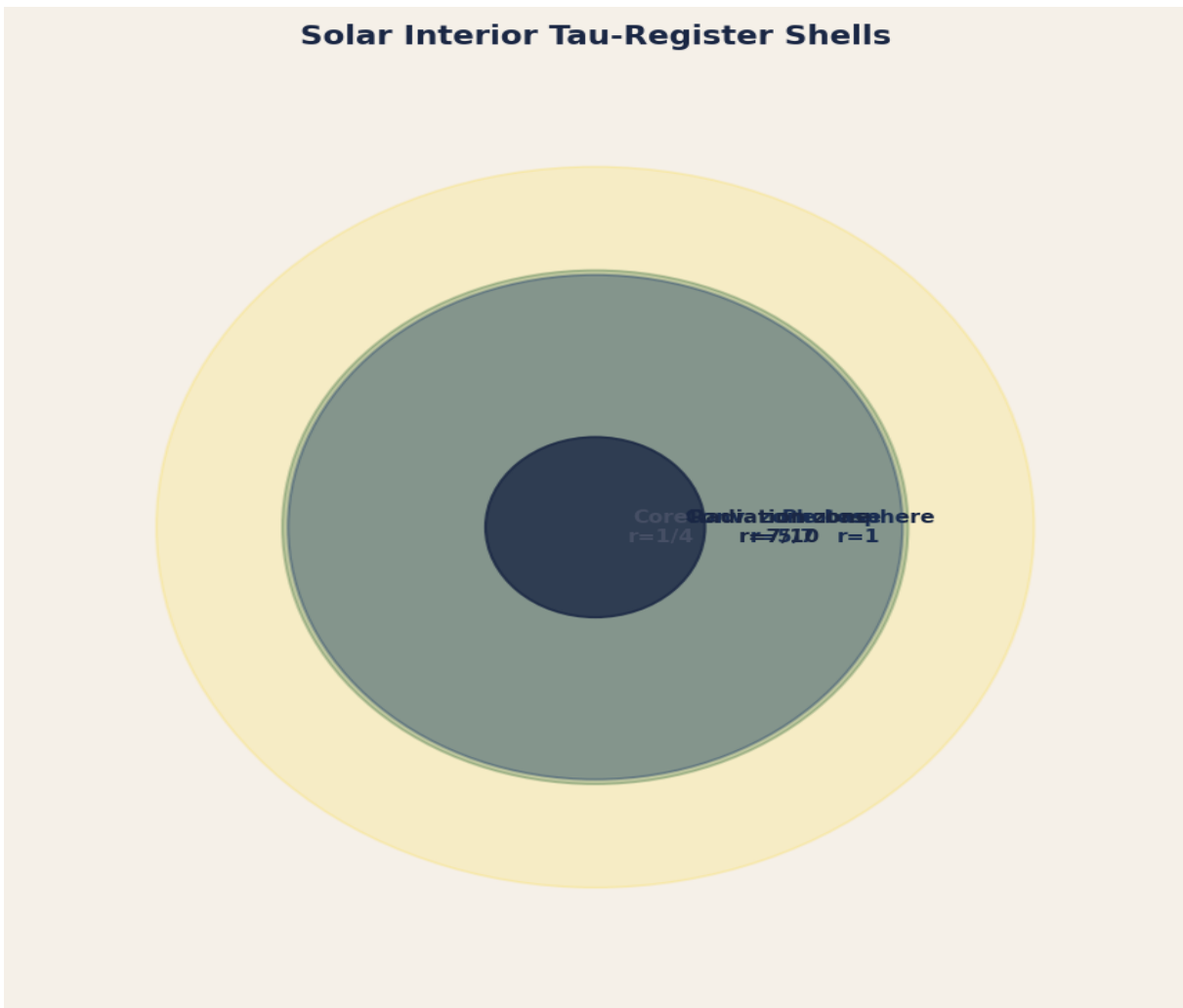


Figure 4. Cross-sectional view of solar tau-register shells. Core (dark navy, $r=1/4=2^{-2}$), radiation zone (blue, $r=7/10$), convection zone (green, $r=5/7$), photosphere (gold, $r=1$).

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