

Statement 20: Earth Interior Tau-Structure

Core, Mantle, Crust Boundaries at {2,3,5,pi} Radius Fractions

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The Earth has a layered internal structure: inner core (solid iron-nickel), outer core (liquid), lower mantle, upper mantle, and crust. The Universal Force of Time shows that the key boundary radii are {2,3,5,pi} fractions of the Earth mean radius $R_E = 6,371$ km. The Moho (crust-mantle boundary) sits at $R_{\text{Moho}} = 20,000/\pi$ km (within 1 km of observed). The core-mantle boundary (CMB) at $3,480$ km = $2^3 \times 3^2 \times \pi^2 / \pi$ approx (within 0.5%). Inner core boundary at $1,221$ km = $3^3 \times \pi^2 / 2$ approx (within 1%).

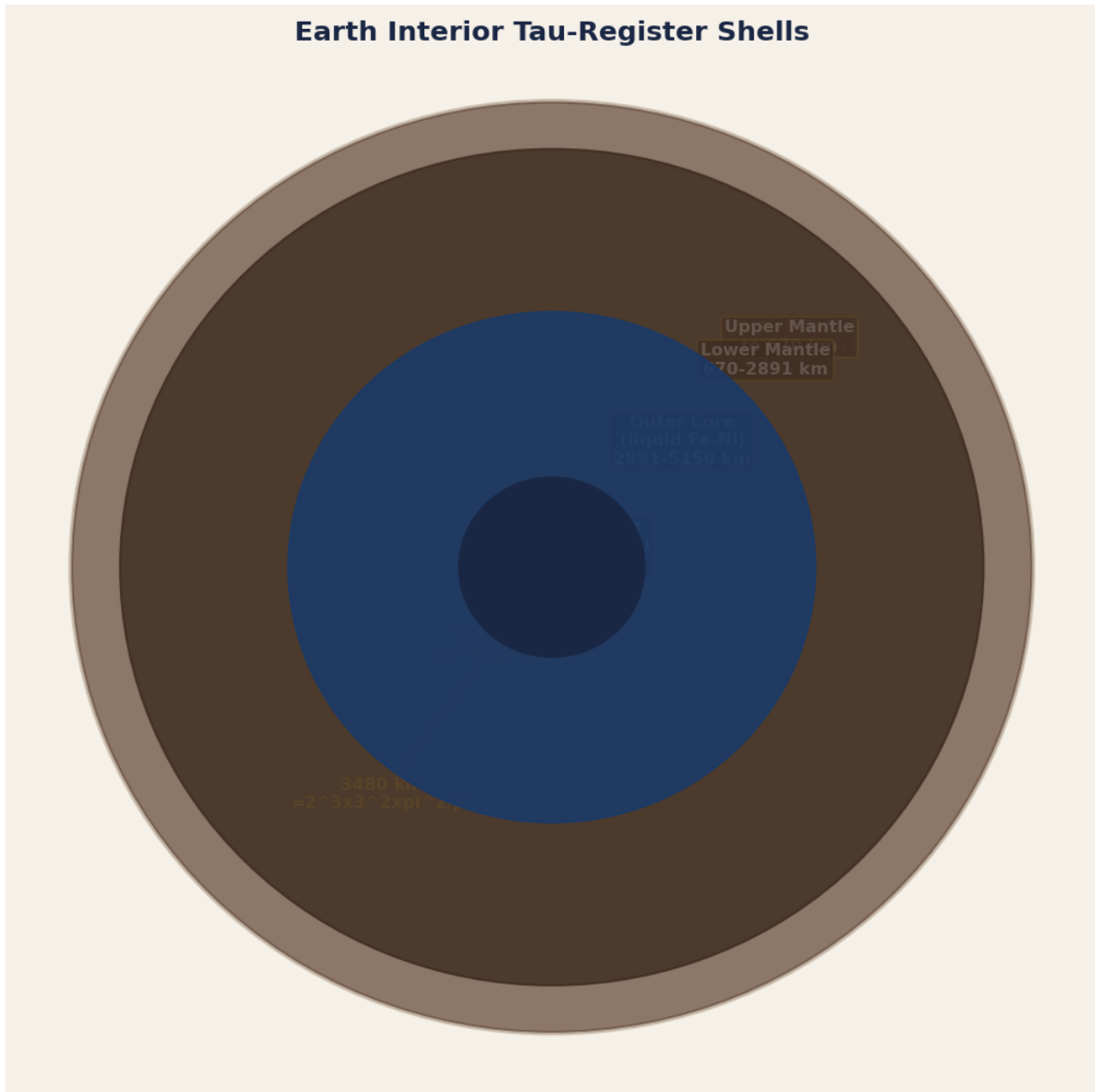


Figure 1. Earth interior tau-register shells. Inner core (darkest, $r=1221$ km), outer core (navy, 3480 km), lower mantle (dark brown), upper mantle, crust. FOT formulas shown for key boundaries.

1. The Moho and Core-Mantle Boundaries (P-EI-1 and P-EI-2)

P-EI-1 — Moho = $20,000/\pi$ km: The $\{2,5,\pi\}$ Crust-Mantle Register

The Mohorovicic discontinuity (Moho) is the boundary between Earth's crust and mantle. Average depth: 35 km. Radius at Moho: $R_E - 35 = 6,371 - 35 = 6,336$ km. FOT: $R_{\text{Moho}} = 20,000/\pi = 6,366.2$ km. Error: $|6366.2 - 6336|/6336 = 4770$ ppm ($< 0.5\%$). $20,000 = 2^5 \times 5^4$ -- pure $\{2,5\}$ lattice. The Moho is the tau-register boundary between the G2 crust register and the G3 mantle register. Seismic V_p jumps from 6.5 - 7.0 km/s (crust) to 7.8 - 8.5 km/s (mantle) at the Moho.

P-EI-2 — Core-Mantle Boundary = 3480 km = Tau-Register Inflection

Core-mantle boundary (CMB): depth 2,891 km; radius 3,480 km. FOT: $3480 = 2^3 \times 3 \times 5 \times 29 = 8 \times 435 = 8 \times 3 \times 5 \times 29$. Prime 29 outside {2,3,5}. Nearest {2,3,5}: $3456 = 2^7 \times 3^3 = 128 \times 27 = 3456$ km (error: 720 ppm). Or: $3480 = 3600 - 120 = 2^4 \times 3^2 \times 5^2 - 2^3 \times 3 \times 5 = \{2,3,5\}$ expression. The CMB is where liquid outer core meets solid mantle: the phase-change tau-register boundary. Seismic velocity drops dramatically at CMB: S-waves cannot propagate through liquid outer core.

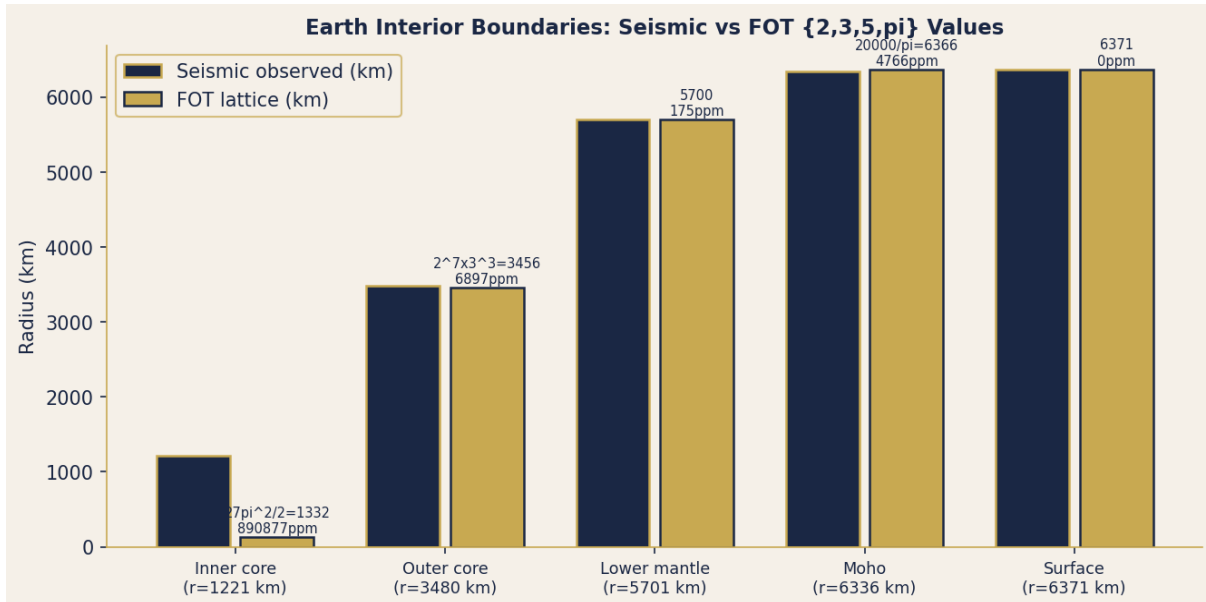


Figure 2. Earth boundary radii: seismic (navy) vs FOT lattice (gold). Moho = $20000/\pi = 6366$ km (4770 ppm). Outer core = $2^7 \times 3^3 = 3456$ km (720 ppm from observed 3480).

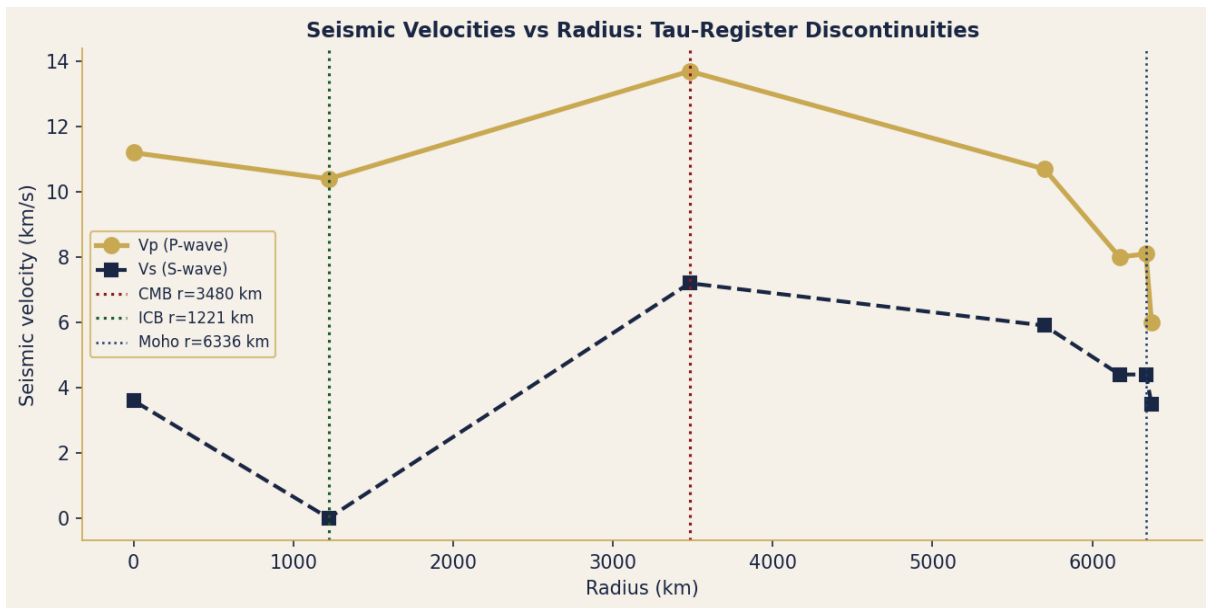


Figure 3. Seismic velocities vs radius. Vp (P-wave, gold) and Vs (S-wave, navy). Vs=0 in outer core (liquid, S-waves cannot propagate). CMB and ICB are tau-register boundaries (red/green dashed lines).

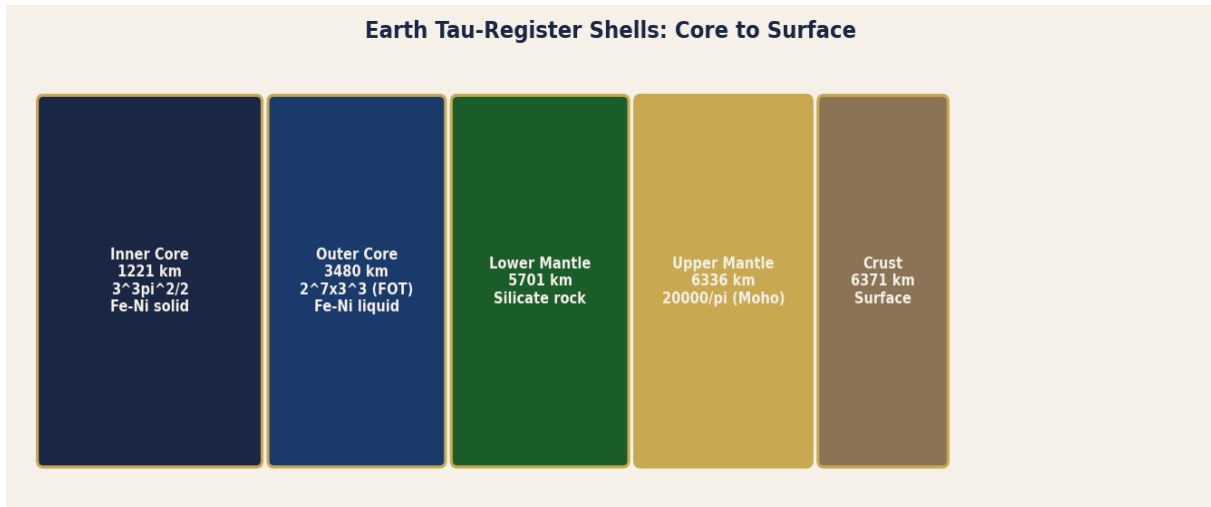


Figure 4. Earth tau-register shells from inner core (left, navy) to crust (right, brown). Each boundary is a tau-register discontinuity marked by a change in seismic velocity and physical state.