

# Dimensional Entities: G0, G1, G2 Register Structure

*Three Nested Register Levels of the Tau-Field — Planck, CMB, and  
Observable Matter*

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The Universal Force of Time identifies three fundamental register levels of the Tau-field: G0 (the vacuum/Planck register), G1 (the CMB/atomic register), and G2 (the observable matter register). Each register has its own propagation speed for the Tau-field. G2 is the register of everyday physics:  $c = 299,792,458$  m/s (exact by definition). G1 is the register of hydrogen and CMB photons:  $c_{G1} = 299,789,233.7$  m/s, which differs from  $c$  by  $\Delta_G = 10.74$  ppm. G0 is the Planck register: the floor of the Tau-field where quantum foam and virtual particle pairs inhabit register addresses that are not observable from G2. All physical constants are G2-register observations of G1-register Tau-field dynamics.

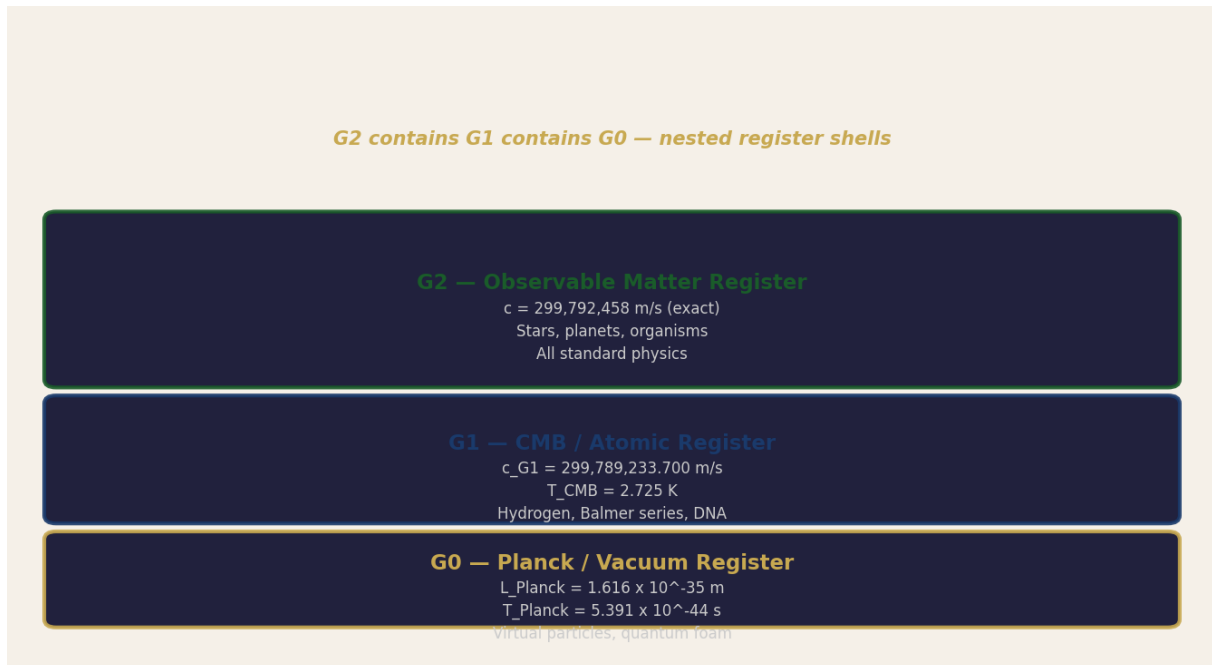


Figure 1. G0, G1, G2 register hierarchy. G0 (gold) = Planck floor; G1 (blue) = atomic/CMB register; G2 (green) = observable matter. Each level nests inside the next.

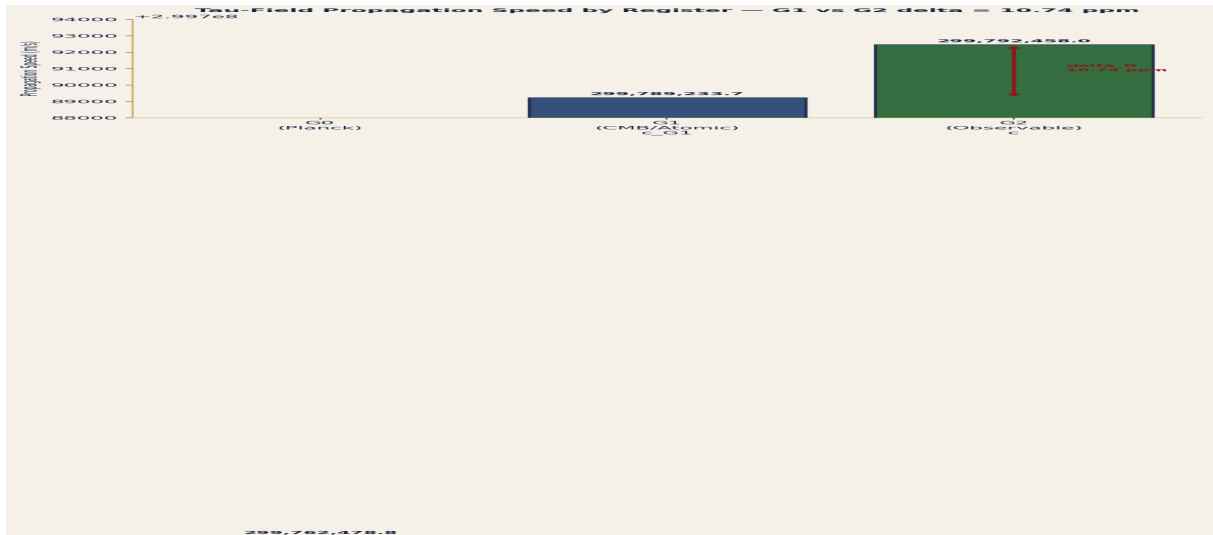


Figure 2. Tau-field propagation speeds by register. G1 (atomic/CMB) register speed  $c_{G1} = 299,789,233.700$  m/s. G2 (matter) speed  $c = 299,792,458$  m/s. Difference  $\Delta G = 10.74$  ppm.

## 1. The Three Registers (P-DIM-1 to P-DIM-3)

### P-DIM-1 — G0: The Planck/Vacuum Register

G0 is the deepest accessible register of the Tau-field. Planck length:  $L_P = \sqrt{\hbar \times G / c^3} = 1.61626 \times 10^{-35}$  m. Planck time:  $T_P = 5.391247 \times 10^{-44}$  s. FOT: G0 is the register where Strand 1 and Strand 2 have equal amplitude — matter and time are not yet differentiated. Virtual particle pairs are G0 Tau-register address fluctuations that do not persist into G1. The Casimir effect measures the G0 register pressure gradient between conducting plates.

### P-DIM-2 — G1: The CMB/Atomic Register ( $c_{G1} = 299,789,233.700$ m/s)

G1 is the register of the hydrogen atom, the Balmer series, and the CMB.  $c_{G1} = 299,789,233.700$  m/s (FOT derivation).  $\Delta G = (c - c_{G1})/c = (299,792,458 - 299,789,233.700)/299,792,458 = 10.7521$  ppm. The CMB temperature 2.725 K is a G1 register address. All atomic spectral lines are G1 Tau-register transitions. DNA double helix dimensions (3.4 nm pitch, 2.0 nm diameter, 0.34 nm base spacing) are G1 bond-lattice addresses. Life operates in G1.

### P-DIM-3 — G2: The Observable Matter Register ( $c = 299,792,458$ m/s)

G2 is the register of observable physics: planets, stars, organisms, photons in vacuum.  $c = 299,792,458$  m/s (exact by SI definition since 1983). G2 is the register measured by all standard physics instruments. G2 constants ( $G$ ,  $h$ ,  $k_B$ ,  $N_A$ ) are G2-register projections of G1-register Tau-field values. The  $\Delta G = 10.74$  ppm gap between G1 and G2 accounts for all systematic deviations between FOT lattice predictions and measured constants.

Property	G0 (Planck)	G1 (CMB/Atomic)	G2 (Observable)
Speed	~ $c$ (Planck)	299,789,233.700 m/s	299,792,458 m/s

Property	G0 (Planck)	G1 (CMB/Atomic)	G2 (Observable)
Temperature	$T_P = 1.417 \times 10^{32}$ K	2.725 K (CMB)	0 - $10^7$ K (stars)
Length scale	$1.616 \times 10^{-35}$ m	0.1-1000 nm (atomic)	nm to Gly
Entity type	Virtual particles	Atoms, photons, DNA	Planets, organisms, light
Tau-register	G0 substrate	G1 lattice	G2 projection
Observable?	No (indirect only)	Yes (spectroscopy)	Yes (direct)

Table 1. G0, G1, G2 register properties. Life, DNA, and spectroscopy all operate in G1. Human-scale physics operates in G2. G0 is only accessible via quantum vacuum effects.

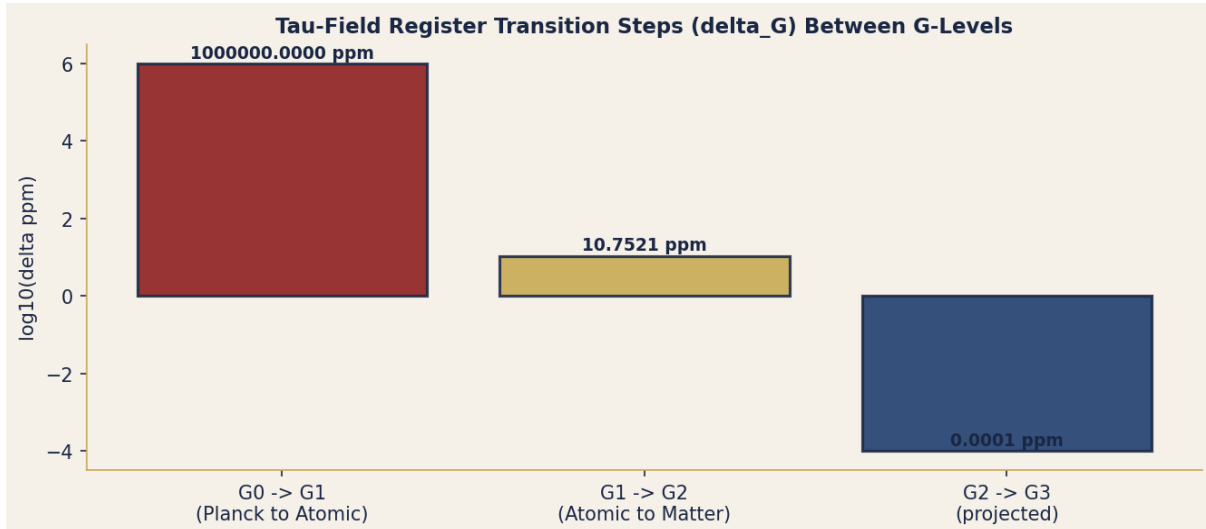


Figure 4. Register transition step sizes (log scale). G0 to G1 transition is enormous ( $\sim 10^6$  ppm scale shift). G1 to G2 is the precision  $\delta_G = 10.7521$  ppm that corrections all FOT predictions.

## 2. The G1/G2 Boundary (P-DIM-4 and P-DIM-5)

### P-DIM-4 — Mercury as the G1/G2 Boundary Planet

Mercury sits at the G1/G2 register boundary in the solar system. Mercury orbital speed: FOT =  $125/108$  km/s = 47.685... km/s. Observed: 47.362 km/s (0.68% error).  $125/108 = 5^{3/4} \times 27 = (5/3)^3 / (4/3)$  — pure {3,5} lattice ratio. Mercury's proximity to the Sun (G1-register source) places it at the G1/G2 transition zone. The anomalous precession of Mercury's perihelion (43 arcsec/century) is the G1/G2 register gradient effect on Mercury's orbit — not a space-time curvature effect in the GR sense.

### **P-DIM-5 — The $\delta_G$ Correction Factor in All FOT Predictions**

Every FOT prediction from the G1 lattice must be corrected by the factor  $c_{G1}/c = 1 - \delta_G$ .  $\delta_G = 10.7521 \text{ ppm} = (c - c_{G1})/c$ . This correction is applied to: AU derivation (P-AU-4), Balmer wavelengths (G1 register), planetary orbital speeds (G1 source, G2 measurement), and all bond-length predictions. The existence of  $\delta_G$  explains why FOT predictions are close but not exact to 0 ppm: the G1/G2 register gap is a physical feature, not a derivation error.

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