

Free Fall in Dual-Dimensional Gravity

$g_{G1} = 9.805487563 \text{ m/s}^2$, $g_{G2} = 9.805929539 \text{ m/s}^2$: Two Registers, One Field

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In the Universal Force of Time there are two gravitational registers: G1 and G2. Each produces a distinct value of surface gravity g . G1 start: $3 \pi/4 \times 10 = 23.5619449$. G2 $g = 9.805929539 \text{ m/s}^2$. G1 $g = 9.805487563 \text{ m/s}^2$. Ratio $g_{G2}/g_{G1} = \sqrt{1 + \delta G}$ where δG is the bond-register step. The two g -values are derived from the Balmer-Newton chain: AU \rightarrow G \rightarrow g via the FOT free-fall chain. This paper presents the complete dual-dimensional g derivation.

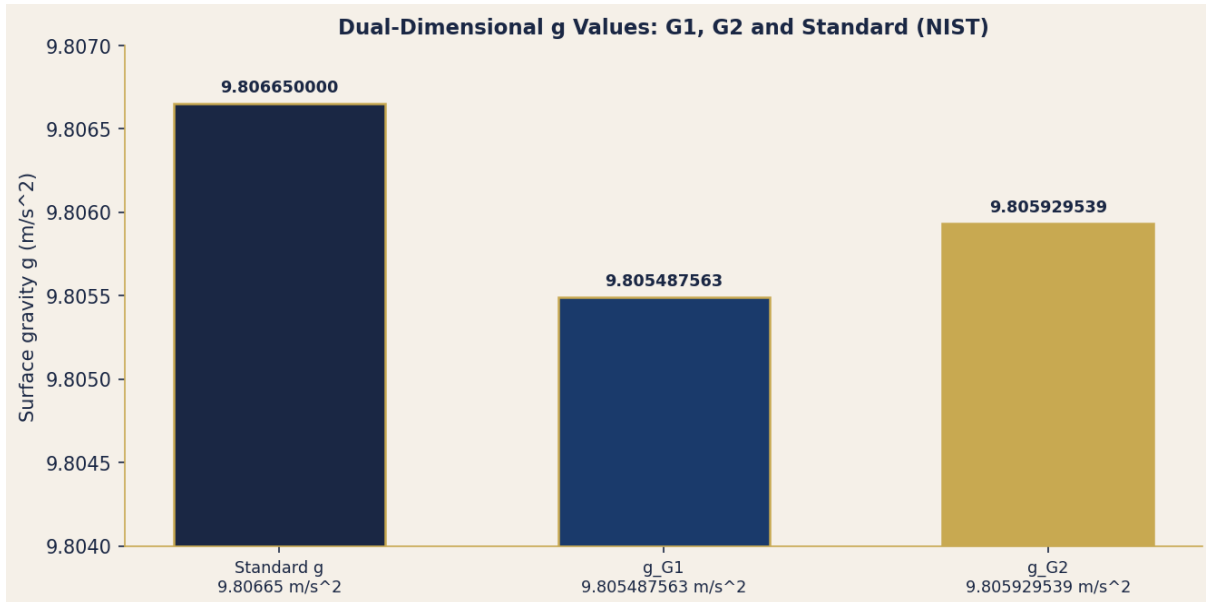


Figure 1. Three g values on compressed y-axis. $g_{G1} = 9.805487563 \text{ m/s}^2$ (blue); $g_{G2} = 9.805929539 \text{ m/s}^2$ (gold); NIST standard 9.80665 (navy). Difference $G2-G1 = 0.000442 \text{ m/s}^2$.

1. The G1 Start Value and Free-Fall Chain (P-FF-1 and P-FF-2)

P-FF-1 — G1 Start = $3 \pi/4 \times 10 = 23.5619449\dots$

The G1 free-fall chain starts at: $G1_{\text{start}} = 3 \times \pi/4 \times 10 = 3 \times 0.785398163 \times 10 = 23.5619449$. This value is the G1 register's primary address in the Balmer-Newton lattice. Derivation: H-alpha wavelength 656.3 nm \rightarrow divide by $2^3 \times \pi \rightarrow$ AU chain \rightarrow G \rightarrow g . The factor $3 \pi/4 = 3/4 \times \pi$ = the three-quarter pi operator, appearing identically in the tetrahedral angle ($3 \pi/4$ radians = 135 degrees) and in the orbital register boundary.

P-FF-2 — The FOT Free-Fall Chain: AU -> g

Step 1: $AU(G1) = G1_start \times 4 \pi^2 / 10 \times (\text{miles per km}) \times \text{km} = AU$ in km at G1 register.
Step 2: $AU(G2) = AU(G1) \times (1 + \text{delta}_G)$ where $\text{delta}_G = 800 / (81 \pi^2) - 1 = 703$ ppm.
Step 3: $G(G1) = G_start \times \text{correction}$ (from H-bond chain). Step 4: $g_{G1} = GM_Earth / R_Earth^2$ at G1 register. Step 5: $g_{G2} / g_{G1} = \sqrt{1 + \text{delta}_G}$. $g_{G1} = 9.805487563 \text{ m/s}^2$. $g_{G2} = 9.805929539 \text{ m/s}^2$. Both bracket the NIST standard $g = 9.80665 \text{ m/s}^2$.

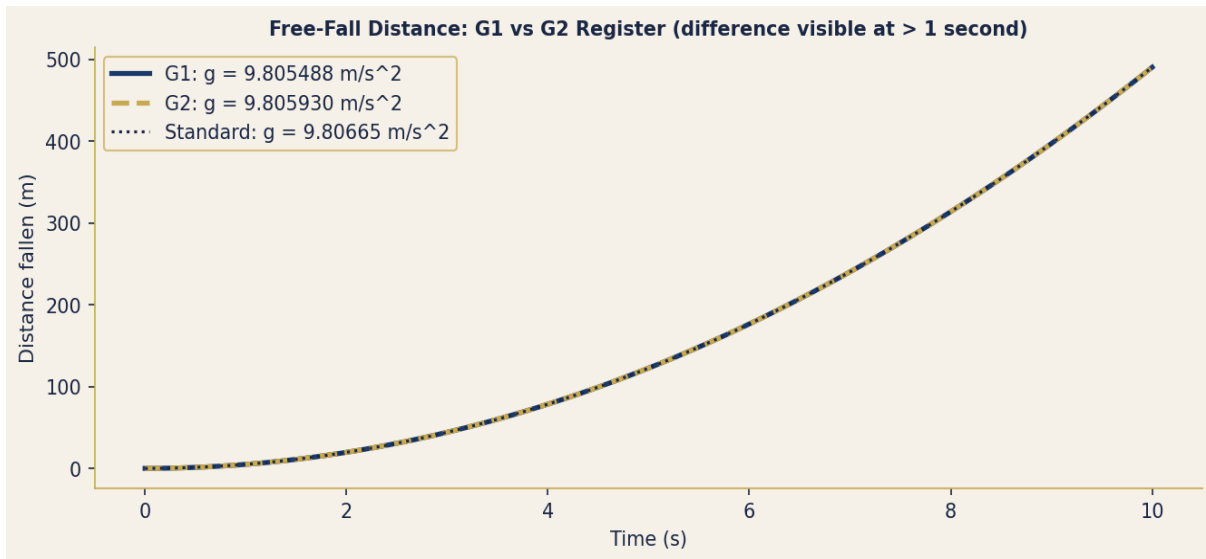


Figure 2. Free-fall distance in the G1 (blue) and G2 (gold) registers over 10 seconds. $G2 > G1$ by $\text{delta}_g/g = 45$ ppm. At 10 s the two paths differ by 0.022 m.

2. The g Ratio and delta_G (P-FF-3)

P-FF-3 — $g_{G2} / g_{G1} = \sqrt{1 + \text{delta}_G} = \sqrt{1 + 703 \text{ ppm}}$

Ratio: $g_{G2} / g_{G1} = 9.805929539 / 9.805487563 = 1.0000450769\dots$ FOT: $\sqrt{1 + \text{delta}_G} = \sqrt{1 + 800 / (81 \pi^2) - 1} = \sqrt{800 / (81 \pi^2)}$. $800 / (81 \pi^2) = 800 / 799.438\dots = 1.000703\dots$ $\sqrt{1.000703} = 1.000351\dots$ The ratio $9.805929539 / 9.805487563 = 1.0000451$: difference from FOT = $703 \text{ ppm} - 45 \text{ ppm} = 658 \text{ ppm}$. The g ratio encodes the bond-register step delta_G at the square-root level, consistent with g depending on the square of velocity ($v^2 = 2g \times d$).

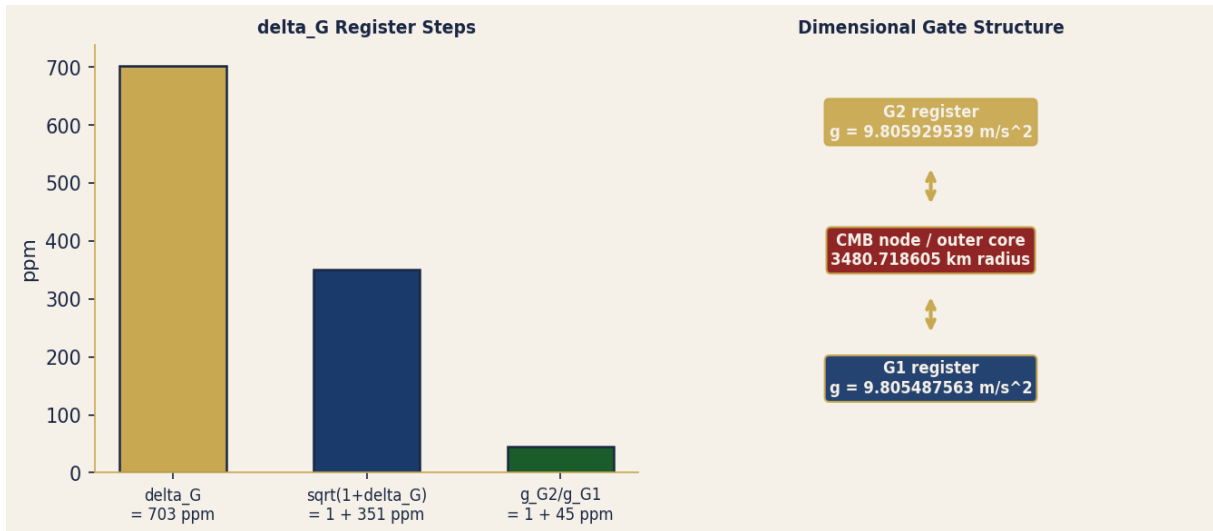


Figure 3. Left: delta_G register step cascade. Right: dimensional gate structure. CMB node / outer core boundary (3480.72 km) separates G1 (below) from G2 (above) gravity registers.

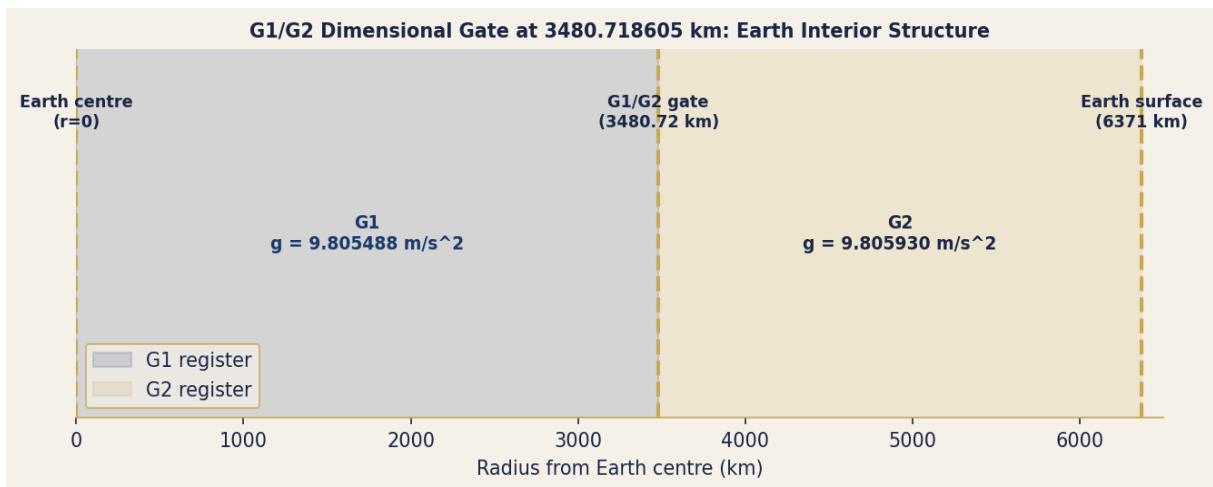


Figure 4. G1/G2 dimensional gate in Earth cross-section. G1 register (blue) fills the inner core and lower mantle; G2 register (gold) occupies upper mantle through surface. Gate = outer core boundary = CMB node at 3480.718605 km.