Equation of the Universe

Electron

Document Class: Atomic: Details and Derivations

Author: Glenn R. King
Independent Researcher, Akron, Ohio, USA
Email: Gking@DMsHelper.com

Version: Rev 3.46.2
January 2026 EST

This document depends on
Equation of the Universe — Core Theory (Rev 3.45 or later)

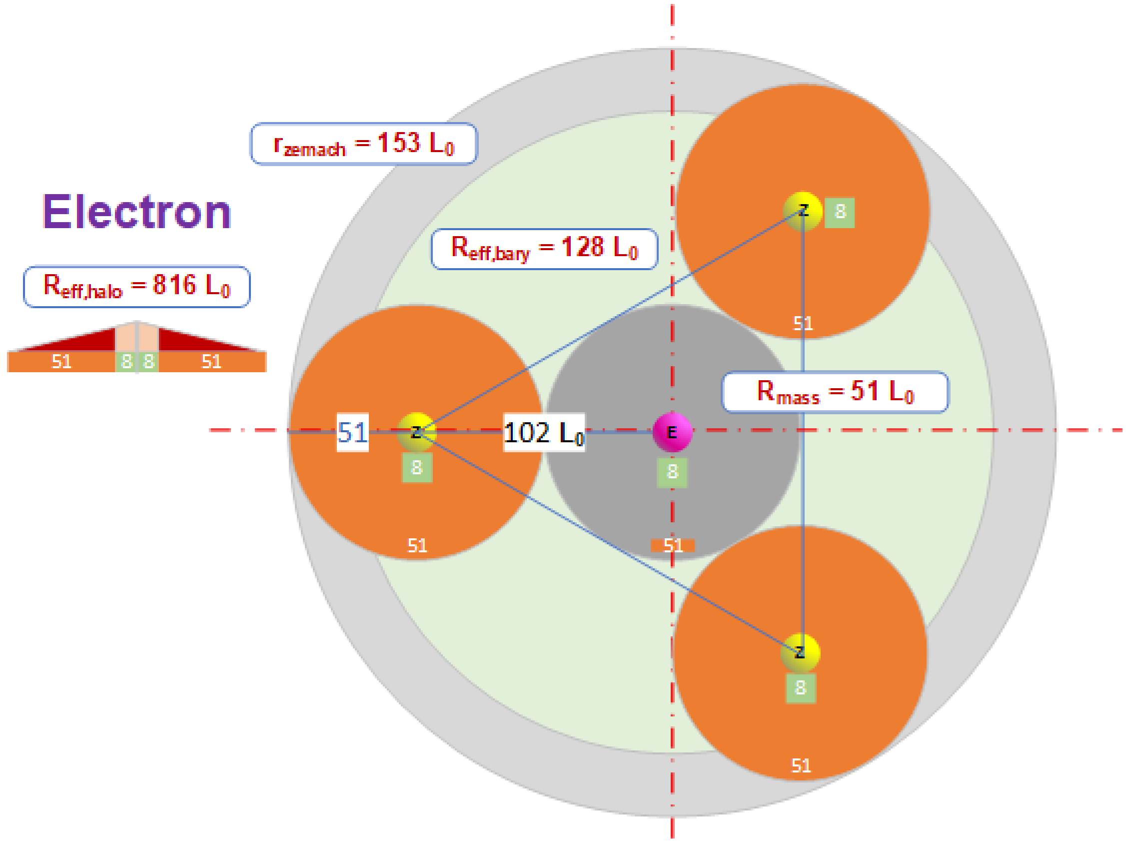

Figure 1: Fully closed Emeon

0.1 curvature energy inventory

- The equilateral area factor $\sqrt{3}/4$
- half-inventory normalization $1/2$
- The square-root mapping from area to mass

$$N = \frac{1}{2} aH$$

For an equilateral triangle:

$$H = \frac{\sqrt{3}}{2} a$$

Substitute:

$$N = \frac{1}{2} a \left(\frac{\sqrt{3}}{2} a \right) = \frac{\sqrt{3}}{4} a^2$$

Your mass mapping rule is:

$$m = \sqrt{\frac{N}{2}} = \sqrt{\frac{1}{2} \cdot \frac{\sqrt{3}}{4} a^2} = \sqrt{\frac{\sqrt{3}}{8}}\, a$$

0.2 cosmology baryon fraction

The **best-fit cosmology baryon fraction.** Using Planck 2018 base-ΛCDM values ($\Omega_b h^2 \approx 0.0224, \Omega_c h^2 \approx 0.120$), the baryon fraction of total matter is (See _EOTU_CPP_Base_v3.41.13 or above)

$$f_b = \frac{\Omega_b}{\Omega_b + \Omega_c} \approx \frac{0.0224}{0.0224 + 0.120} \approx 0.157 \approx \frac{8}{51} = 0.1568627$$

Using the locked geometric based on the measured value ratio Baryonic (Core)/Dark Matter (Halo).

All halo and core radii are expressed as integer multiples of L_0.

$$\boxed{L_0 = 64}, \quad \frac{r_C(k)}{r_H(k)}, \quad \frac{r_C(1)}{r_H(1)} = \frac{8}{51}$$

0.3 Definitions (Locked)

- Lattice multiplier / bridge constant: $L_0 = 64$. L_0 is a fixed lattice multiplier (64) and does not represent a dimensional length in this derivation.
- CPP radii (for a given ladder index k): $r_H(k) = 51k\, L_0,\; r_C(k) = 16k\, L_0$
- Γ-closure operator: $E = \Gamma \frac{N}{2},\; \Gamma = 1\ \text{eV}$
- The mass-factor m is the dimensionless curvature-closure measure whose square maps to energy via Γ.
- Inventory N is computed from geometry:
  - 2D (planar): $N_A = \pi r^2$
  - 3D (spherical): $N_V = \frac{4}{3}\pi r^3$
  - Note: we treat N as the geometric “inventory count” of the region implied by the chosen realization (2D or 3D). No additional parameters are introduced.

$$\boxed{E_e = \Gamma\, m_x{}^2}, \quad \boxed{\%\Delta = \frac{\Delta E}{E_{meas}} \cdot 100}$$

0.4 Electron R_{Eff}

For planar triad composites, the effective reach index is defined as $k_{\text{CPP}} = N_{\text{CPP}}^2$.

$$N_{\text{EZZZ}} = 4$$

$$k_{\text{CPP}}(EZZZ) \equiv\ k_{\text{EZZZ}} = (N_{\text{EZZZ}})^2 = 4^2 = 16$$

$$R_{\text{eff}}(k_{\text{EZZZ}}) = (51\, k_{\text{EZZZ}})\, L_0$$

$$R_{\text{eff}} = 51(16)\, L_0 = 816\, L_0 = 52{,}224$$

The composite core for baryonic then becomes:

$$R_{\text{eff, baryonic}} = \frac{8}{51} 816\, L_0 = 128\, L_0 = 18{,}432$$

---

§1 Electron - Combined Emeon-Zeteon Triad (E+ZZZ) Region

Electron (EZZZ) is the minimal Region in which a phase-biased core (Emeon) is surrounded at N=1 by a planar Zeteon-triad that cancels dipole-order curvature anisotropy, leaving a predominantly phase-governed external interaction.

1.1.1 Electron Phase Descriptor $\boldsymbol{\mathcal{P}_{EZZZ}(\theta)}$

$$\mathcal{P}_{EZZZ}(\theta) = \mathcal{P}_E(\theta) + \mathcal{P}_{\triangle Z}(\theta) = q_0 \cos\theta + 3q_0 \sin\theta$$

By definition of the CPP eigen-phase assignments:

- Zeteon triad are phase-locked to the King cycle at $\Phi_Z = 0$
- The Emeon core carries intrinsic phase offset $\Phi_E = \pi/2$

Therefore, for $0 \le \theta \le 2\pi$: Core phase projection:

$$\mathcal{P}_E(\theta) = q_0 \sin\left(\theta + \frac{\pi}{2}\right) = q_0 \cos\theta$$

Triad phase projection:

$$\mathcal{P}_{\triangle Z}(\theta) = 3q_0 \sin\theta$$

Here $q_0 \equiv \Delta A$ is the native CPP signed phase-channel amplitude. It is not the SI elementary charge e. The SI charge response is introduced only through the Coulomb-response bridge defined in the CPP document.

The core and triad oscillate in strict quadrature:

- When $\cos\theta$ is maximal, $\sin\ \theta = 0$.
- When $\sin\theta$ is maximal, $\cos\ \theta = 0$.

Thus no instant exists during the King cycle in which both the core and triad reach peak phase projection simultaneously. This orthogonality is not imposed; it follows directly from the eigen-phase assignments of the CPP species.

1.1.2 Electron Curvature Descriptor $\boldsymbol{\mathcal{C}_{EZZZ}(\theta)}$

$$\mathcal{C}_e(\theta) = \mathcal{C}_E + \mathcal{C}_{\triangle Z} + \mathcal{C}_{int} \equiv m_e$$

Electron Mass **(For details see _EOTU_CPP_Primordial_Type_Emeon_v3.y.z)**

$$m_e = (4s + r_c) = \left[4\left(102\sqrt{3}\right) + 8\right] = \left(408\sqrt{3} + 8\right)$$

$$m_e = (706.6767295 + 8) \approx 714.6767295, \qquad (\text{in } L_0 - \text{units})$$

Electron Reach $k_{\text{CPP}}\ (E - ZZZ) = 4^2 = 16$:

$$R_{\text{eff}}\ (k) = (51\ k_{\text{CPP}})\ L_0 = 51(16)\ L_0 = 816\ L_0$$

The composite core for baryonic then becomes $k_{\text{CPP}}\ (E - ZZZ) = 4^2 = 16$:

$$\text{R\_eff, baryonic} = \frac{8}{51} 816\, L_0 = 128\, L_0$$

1.1.3 Electron Wave Function

Steady-state corridor disturbance fields emitted by each Region.

$$\Psi_e(r,t) = A_e \frac{\cos\left(k_e r - \omega_e t + \Phi_e\right)}{r}$$

with: $\lambda_e = 816\, L_0$

1.1.4 Electron Energy

Measured value = 510,998.95 eV

$$E_e = \Gamma(714.6767)^2 = 510{,}762.7855 \text{ eV}$$

$$510{,}762.79 - 510{,}998.95 = -236.16 \text{ eV}$$

$$\%\Delta = \frac{\Delta E}{E_e^{meas}} \times 100 = \frac{-236.16}{510{,}998.95} \times 100 = -0.04622\%$$

Difference from measured is ≈ -0.0462% which slightly underestimates the measured value

---

1.1.5 Electron Electric field

$$Q_{enc}(\theta) = \sum_i q_i\,(\theta)$$

$$q_i(\theta) = q_0 \sin(\theta + \Phi_i)$$

For the electron Region:

$$Q_{EZZZ}(\theta) = q_0 \cos\theta + 3q_0 \sin\theta$$

At the King-cycle boundary, the Zeteon triad contributes no resolved net charge:

$$Q_{EZZZ,\partial K} = -q_0$$

depending on sign convention for the electron Region.

$$\boxed{\vec{\mathcal{E}}(r,\theta) = \frac{Zc}{4\pi} \frac{Q_{\text{enc}}(\theta)}{r^2}\,\hat{r}}$$

Where

- Z is the **fabric property impedance** = 376.730313412 Ω
- c is the speed of light

---

§2 — Electron Properties

2.1 Calculating Electron Mass m_e

The electron mass emerges as near-total defect cancellation inside a fixed curvature envelope.

2.1.1 Mass m_e from Geometry

From Geometry node placement (120° about E) ⇒ Z–Z side length (center-to-center): The closure contains **four CPPs** (E + 3Z). The only non-arbitrary length set by the triad itself (not the envelope) is the **triad side** s. A minimal "closure loop" built from the triad edges assigns one edge-length contribution per CPP, giving a 4-segment closure measure:

$$m_e^{(\mathrm{geom})} \equiv (4s + r_c), \qquad (\text{in } L_0 - \text{units})$$

where

- $r_c = 8$
- $r_h = 51$ Halo radius (all four halos): Tangency (E–Z center spacing)
- $h = 2\, r_h = 102$ Triad node placement (120° about E) ⇒ Z–Z side length (center-to-center)
- $s = 2\sqrt{3}\, r_h = 102\sqrt{3} \approx 176.669$

Solving the equation

$$m_e^{(\mathrm{geom})} = (4s + r_c) = \left[4\left(102\sqrt{3}\,\right) + 8\right] = \left(408\sqrt{3}\ + 8\right)$$

$$m_e^{(\mathrm{geom})} \equiv\ m_{e,\mathrm{geom}} \approx (706.6767295 + 8) = 714.6767295, \qquad (\text{in } L_0 - \text{units})$$

This geometry uses the **primitive** CPP halo radius $r_h = 51$ (in L_0units) as the internal tangency spacing that defines the Z-triad. This internal geometry is independent of the electron's ladder embedding radius (153 L_0).

2.1.2 Mass $\boldsymbol{m_f^E}$ From Defect Rule

$$m_{f,E}(e) \equiv m_e \equiv m_{EZZZ} = \left(m_f^E + m_{Z\Delta} + \Delta m_{int}\right)$$

For Defect index Z = 3

$$n(Z = 3) = 512 + 2[5(Z - 1)]^2 = 712, \qquad (\text{in } L_0 - \text{units})$$

$$m_{Z\Delta} = 712\, L_0 = 712 \cdot 64 = -\ 45{,}568 \text{ (negative as defect)}$$

$$m_e \approx 46{,}282.314955 \text{ - } 45{,}568 = 714.314955$$

2.2 Electron Energy

Measured value = 510,998.95 eV

2.2.1 From Geometry

$$E_e = \Gamma(714.6767)^2 = 510{,}762.7855 \text{ eV}$$

$$510{,}762.79 - 510{,}998.95 = -236.16 \text{ eV}$$

$$\%\Delta = \frac{\Delta E}{E_e^{meas}} \times 100 = \frac{-236.16}{510{,}998.95} \times 100 = -0.04622\%$$

2.2.2 From Defect Rule

$$E_e = \Gamma(714.314955)^2 = 510{,}245.8549 \text{ eV}$$

$$510{,}245.8549 - 510{,}998.95 = -753.0951 \text{ eV}$$

$$\%\Delta = \frac{\Delta E}{E_e^{meas}} \times 100 = \frac{-753.0951}{510{,}998.95} \times 100 = -0.1474\%$$

2.3 Electron Electric field

For a Region made of CPPs at positions $\vec{r}_i$, define a source density:

Point-source form (minimal):

$$\boxed{\rho_q(\vec{r},\theta) = \sum_i q_i(\theta)\, \delta(\vec{r} - \vec{r}_i)}$$

Where:

$$q_i(\theta) = q_0 \sin(\theta + \Phi_i)$$

Or smeared/source-projection form (still charge-invariant):

$$\boxed{\rho_q(\vec{r},\theta) = \sum_i q_i(\theta)\, K_\phi(\vec{r} - \vec{r}_i), \int K_\phi(\vec{r})\, d^3r = 1}$$

This guarantees that the charge is invariant. The electric field it produces is:

$$\boxed{\vec{\mathcal{E}}(r,\theta) = \frac{Zc}{4\pi} \frac{Q_{\text{enc}}(\theta)}{r^2} \hat{r}}$$

Where

- Z is the **fabric property impedance** = 376.730313412 Ω
- c is the speed of light
-

EOTU interpretation: $q_{\text{cpp}}(\theta)$is the intrinsic phase-resolved source inventory. The spatial field $\vec{\mathcal{E}}$is the fabric response governed by a divergence (Gauss) law; inverse-square dependence arises from 3D geometry, not from CPP phase decay.

Appendix A: Electron-Electron Interaction

When two electrons collide, the interaction resolves through the combined electron wavelength scale. With the intrinsic electron wavelength already established as

$$\lambda_e = 816\, L_0$$

the two-electron collision wavelength is

$$\lambda_{ee,C} = 2\lambda_e^2$$

Substituting the locked electron value gives

$$\lambda_{ee,C} = 2(816)^2 = 1{,}331{,}712\, L_0$$

Using the locked lattice bridge

$$1\ \text{Å} = 55{,}618{,}373.16\, L_0$$

this becomes

$$\lambda_{ee,C} = \frac{1{,}331{,}712}{55{,}618{,}373.16} = 0.0239437\ \text{Å}$$

This places the two-electron collision wavelength directly in the Compton-scale range with no new constants, no fitted terms, and no added construction. The result follows directly from the locked intrinsic electron wavelength and the locked lattice bridge. The Compton-scale outcome is therefore not imposed from outside the framework; it emerges naturally as the quadratic self-interaction scale of the electron, with the factor of 2 arising from the two-electron collision itself.

Appendix B: External Magnetic-Response Comparison Anchors

For a free electron, the key magnetic-response constants are:

- **electron g-factor**: $g_e = -2.002\,319\,304\,36$
- **electron magnetic moment**: $\mu_e = -9.284\,764\,6917 \times 10^{-24}$ J/T
- **Bohr magneton**: $\mu_B = 9.274\,010\,0657 \times 10^{-24}$ J/Tor $5.788\,381\,7982 \times 10^{-5}$ eV/T
- **electron gyromagnetic ratio**: $\gamma_e = 1.760\,859\,62784 \times 10^{11}$ s^{-1} T^{-1}
- **electron gyromagnetic ratio in frequency units**: 28 024.951 3861 MHz/T= 28.0249513861 GHz/T

The most immediately useful derived numbers for your thread are the **spin splitting per tesla** and the **resonance frequency per tesla**.

That gives these outcome-style wavelength anchors:

0.34 T → 9.53 GHz

$$\lambda \approx 0.03146 \text{ m}, \qquad \lambda \approx 3.1458 \times 10^{8} \text{ Å}, \qquad \lambda \approx 1.7496 \times 10^{16}\, L_0$$

1 T → 28.02495 GHz

$$\lambda \approx 0.010697 \text{ m}, \qquad \lambda \approx 1.069734 \times 10^{8} \text{ Å}, \qquad \lambda \approx 5.94969 \times 10^{15}\, L_0$$

5 T → 140.12476 GHz

$$\lambda \approx 0.00213947 \text{ m}, \qquad \lambda \approx 2.139468 \times 10^{7} \text{ Å}, \qquad \lambda \approx 1.18994 \times 10^{15}\, L_0$$

10 T → 280.24951 GHz

$$\lambda \approx 0.00106973 \text{ m}, \qquad \lambda \approx 1.069734 \times 10^{7} \text{ Å}, \qquad \lambda \approx 5.94969 \times 10^{14}\, L_0$$

And for the **single-electron anomaly frequency** you mentioned earlier, using **174 MHz** as the benchmark:

$$\lambda \approx 1.723 \text{ m}, \qquad \lambda \approx 1.722945 \times 10^{10} \text{ Å}, \qquad \lambda \approx 9.58274 \times 10^{17}\, L_0$$