EOTU CPP Primordial Type
Emeon (Φ = π/2)

Eigen-Family Series — CPP Primordial Types
Equation of the Universe: Emerging Oscillating Fabric Universe
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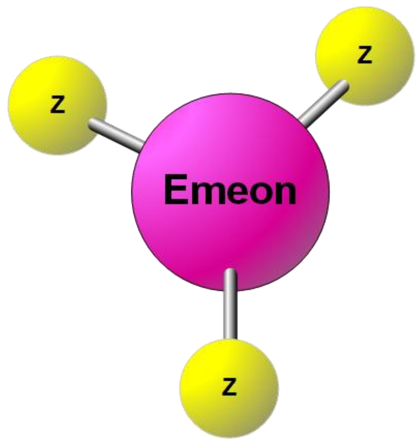

Figure 1: Fully closed Emeon (Electron)

§0 — Phase Identity and Physical Role

In the EOTU lattice, each Emeon (Φ = π/2) exists as part of a primordial **four-packet curvature balance** constrained by King-cycle neutrality. For the lepton sector, the CPP fully closed and stabilized as a quartet **E + 3Z which is called the Electron**:

$$\boxed{\text{Electron } = 1E + 3Z}$$

The requirement of three Zeteons arises from geometric closure: a symmetric triad is the minimal configuration that cancels first-order exterior curvature moments.

During one King cycle, the Emeon and its three Zeteons produce curvature excursions whose **cycle-average amplitudes must sum to zero**:

$$\langle \Delta\mu_E \rangle + 3\langle \Delta\mu_Z \rangle = -\frac{1}{3}\langle \Delta\mu_E \rangle = 0.$$

The Electron's charge q is carried by the Emeon (identified with e) ; ZZZ is closure-only and contributes no charge component. Charge is equal because all CPPs are equal in amplitude and only vary in eigen phase values.

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0.1 The CPP Family phase

During formation, the Emeon emerges as the CPP whose oscillation phase is locked a quarter-cycle ahead of the Zeteon. This identity remains permanent through all Constellus snapshots.

The Emeon is the π/2 eigen-phase CPP, defined by $\Phi = \pi/2$.

This constraint is fundamental: it follows from CPP conservation and does not depend on later composite structures.

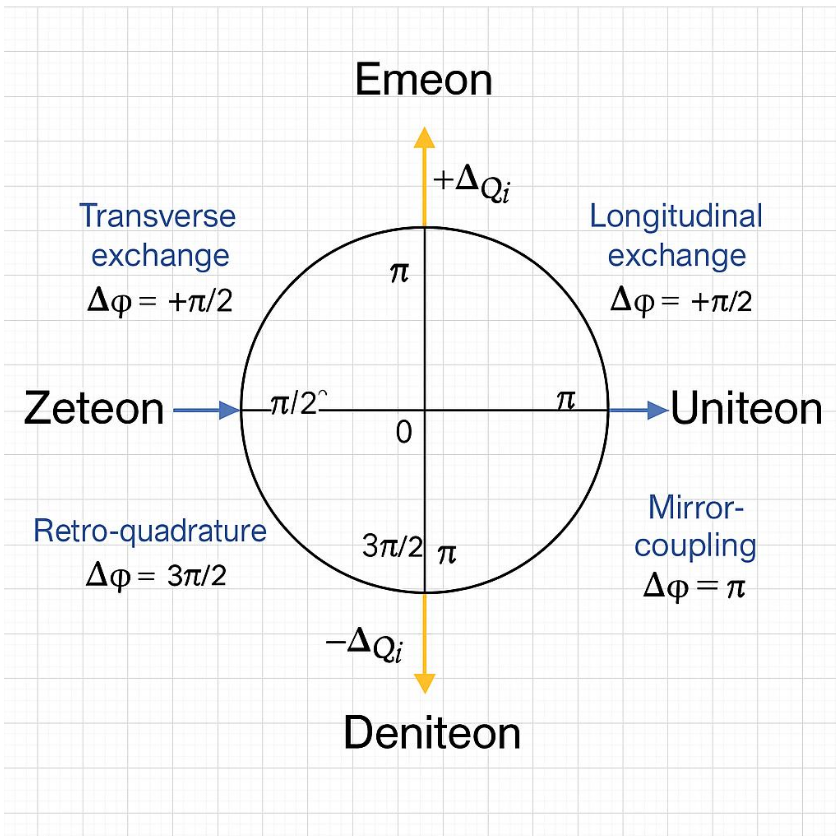

Figure 2 — Phase-circle representation of the four CPP eigen-families.

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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.

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

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.

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

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§3 — Emeon States Applying Defect Law

3.1 Calculating electron mass $\boldsymbol{m_f^E}$ from R_eff

$$m_f^E \equiv m_0 = \frac{1}{\sqrt{2}}\sqrt{\frac{A}{2}} = 46{,}282.314955$$

where

- r_0 = $\mathrm{R_{Eff}} = 816\,L_0 = 816 \cdot 64 = 52{,}224$
- $A = \pi {r_0}^2 = \pi \cdot (52{,}224)^2 \approx 8{,}568{,}210{,}710.318$
- Apply Defect rule for Z=3 (ZZZ):

$$m_{Z\Delta}(e) = 712\,L_0 \Rightarrow m_Z = 712 \cdot 64 = 45{,}568$$

- Electron mass-factor:

$$m_f(e) = m_f^E - m_{Z\Delta}(e) = 46{,}282.314955 - 45{,}568 = 714.314955$$

Predicted energy (model)

$$E_{\text{model}} = \Gamma\, m_f^2 = (714.314955)^2\ \text{eV} \approx 510{,}245.855\ \text{eV} = 0.510245855\ \text{MeV}$$

Measured energy (reference) $E_{\text{meas}} \approx 0.510999\ \text{MeV}$(electron rest energy)

- Absolute: $\Delta E \approx 0.000753\ \text{MeV} = 510{,}245.855 - 510{,}999 = 753\ \text{eV}$
- Relative: $\Delta E/E \approx 0.15\%$

3.2 Electron — State Vector (EZZZ closure)

Identity

- Symbol: e
- CPP inventory: EZZZ
- Role: first stable lepton closure candidate (as currently staged)

Ladder embedding k = 3

Core radius:

$$r_C = 8\,k\,L_0 = 24\,L_0$$

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Halo radius:

$$r_H = 51kL_0 = 153L_0$$

This row is not being derived from free overlap depth; it is being derived from the **Z-triad defect subtraction law** you showed:

Rule ID: e/EZZZ/k3

3.3 Muon — State Vector (EZZ closure)

Identity

- Symbol: μ
- CPP inventory: EZZ
- Role: heavy lepton, open Z-triad (unstable in that thread)

Ladder embedding k=4

- Core radius: $r_C = 8\,k\,L_0 = 32\,L_0$
- Halo radius: $r_H = 51\,k\,L_0 = 204\,L_0$

Mass-factor used (drive) (See Appendix B)

- Anchor: $m_f^E = 46{,}282.314955$
- Defect rule for Z=2 (ZZ): $n(ZZ) = 562 \times 64 = 35{,}968 \Rightarrow m_Z = 35{,}968$
- Muon mass-factor: $m_f(\mu) = m_f^E - m_Z = 46{,}282.314955 - 35{,}968 = 10{,}314.314955$

Predicted energy (model)

$$E_{\text{model}} = (10{,}314.314955)^2\ \text{eV} \approx 106{,}385{,}092\ \text{eV} = 106.385092\ \text{MeV}$$

Measured energy (reference) $E_{\text{meas}} \approx 105.658\ \text{MeV}$

Residual

- Absolute: $\Delta E \approx 0.727\ \text{MeV}$
- Relative: $\Delta E/E \approx 0.69\%$

Rule ID: μ/EZZ/k4

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3.4 Tau — State Vector (EZ closure-unstable)

Identity

- Symbol: τ
- CPP inventory: EZ
- Role: heavy lepton, open Z-triad (unstable in that thread)

Ladder embedding k=16:

- Core radius: $r_C = 8kL_0 = 128L_0$
- Halo radius:$r_H = 51kL_0 = 816L_0$

Mass-factor used (driver) (See Appendix B)

- Anchor: $m_f^E = 46{,}282.314955$
- Defect rule for Z=1 (Z): $n(Z) = 64 \times 64 = 4096 \Rightarrow m_Z = 4096$
- Tau mass-factor: $m_f(\tau) = m_f^E - m_Z = 46{,}282.314955 - 4{,}096 = 42{,}186.314955$

Predicted energy (model)

$$E_{\text{model}} = (42{,}186.314955)^2 \text{ eV} \approx 1.779685 \times 10^9 \text{ eV} = 1{,}779.685 \text{ MeV}$$

Measured energy (reference) $E_{\text{meas}} \approx 1{,}776.86$ MeV

Residual

- Absolute: $\Delta E \approx 2.83$ MeV
- Relative: $\Delta E/E \approx 0.159\%$

Rule ID τ/EZ/k16

3.5 Emeon — State Vector (Primitive CPP E)

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Revision Log

Version	Date	Change Summary
3.42.0	2026-03	• Moved Electron Definitions and derivations to its own document
3.41.1	2026-03	• Added/updated different methods for calculating mass and defects
3.41.0	2026-02	• Removed everything and started over
3.40.3	2026-02	• Changed Section 6 to new rule
3.40.1	2026-02	• Change u from 1/64 • $\Delta A = 7.8125\times10^{-4}$ is under review
3.40.0	2026-02	• Added Electron Size and Appendix A
3.36	2025-11	• Regenerated from older v3.30 draft. • Updated to λ_k, τ_0, and King-cycle formulation. • Removed outdated CBC terms and "mass/charge" placeholders. • Added curvature falloff role, r_eff linkage, and Proteon core physics. • Rewritten amplitude forms using $\bar{\mu}$ and ΔA. • Updated interaction channels and ledger definitions.
3.30	2025-10	Introduced 'Emeon' (ϕ = π/2) as the transverse-phase CPP eigen type serving as the charge-carrier analogue to the empirical electron. Integrated with Zeteon (ϕ = 0) baseline and Photon (Δϕ transition) framework.

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Appendix A — Emeon Lepton Chain Ladder

The Lepton Chain

The Lepton Chain is defined by:

$$(r_C, r_H)_{n+1} = 4 \cdot (r_C, r_H)_n$$

Therefore

$$\boxed{r_C(n) = 8 \cdot 4^n \cdot L_0}, \boxed{r_H(n) = 51 \cdot 4^n \cdot L_0}$$

This preserves the ratio for all n:

$$\frac{r_C(n)}{r_H(n)} = \frac{8}{51}$$

1.1 Table: Ladder 51

Symbol	name	closure	n (closure state)		r_{Core}	r_{Halo}	**Energy (MeV)**
			0	1	$8\ L_0$	$51\ L_0$	
e	Electron	EZZZ	0	3	$24\ L_0$	$153\ L_0$	0.511
μ	Muon	EZZ	1	4	$32\ L_0$	$204\ L_0$	105.66
τ	Tau	EZ	2	16	$128\ L_0$	$816\ L_0$	1776.86
E	Emeon	E	3	64	$512\ L_0$	$3264\ L_0$	

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Appendix B – Using the defect Law to Calculate Mass

The shared closure anchor (M_0, r_0) physically represents the invariant effective curvature-reach boundary (Reff) of the lepton closure family—the fixed dormant-background envelope that all lepton states must satisfy; defects are the quantized interior curvature reconciliations required by the Z-regime that reduce m while leaving the outer boundary condition unchanged; the dyadic structure follows from four discrete eigen-phase states, making 256 the full-cycle closure block and 64 the quarter-cycle defect quantum.

The electron is light/stable because triad closure raises effective closure density and suppresses the Emeon's intrinsic defect by enabling cancellation within a bounded envelope (halo/core structure).

The anchor mass-factor m_0 is determined by the fixed effective curvature envelope R_{eff}, independent of Z-regime defect.

B.2 Geometry Classes

Z = 1 — Pair geometry → dipole defect
$n_{dipole} = d^2$

Z = 2 — Chain geometry → two-channel regime
$n_{chain} = d_1^2 + d_2^2$

Z = 3 — Closed triad → complement-constrained closure
$n_{triad}(u) = u^2 + (32 - u)^2$

The defect index $n$is determined entirely by geometry class and integer-lattice closure. No independent numeric fitting is introduced.

Z = 0 — Isolated CPP

$$n_0 = 0$$

Z = 1 — Dipole Regime

$$n_1 = d^2$$

Dipole state:

$$n_1 = 8^2 = 64$$

Z ≥ 2 — Closure Regime
Two active separation channels constrained by fixed complement width:

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$$d_1 + d_2 = 32$$

Closure imbalance grows linearly with added Z:

$$k(Z) = 5(Z - 1)$$

Defect index:

$$\boxed{n(Z) = 512 + 2[5(Z - 1)]^2 (Z \geq 2)}$$

Results

$$Z = 1 \Rightarrow n = 64, Z = 2 \Rightarrow n = 562, Z = 3 \Rightarrow n = 712$$

B.3 Calculating Tau EZ – Emeon with open Z-Triad (unstable)

$$m_{f,E}(\tau) \equiv m_\tau \equiv m_{EZ} = \left(m_f^E + m_{Z1} + \Delta m_{int}\right)$$

From triad closure defect for Z=1, $n(Z) = 64 \times 64 = 4096$

$$m_{Z1} = 4096$$

using known numbers

$$\boxed{m_{Z1,\text{expected}} = m_f^E - m_\tau = -4{,}129.49773}$$

Therefore:

$$m_\tau \approx 46{,}282.314955 - 4{,}096 = 42{,}186.314955$$

Energy standard τ rest energy $E_{\tau,\text{meas}} \approx 1.77686 \times 10^9$ eV, this gives:

$$E_{EZ} = \Gamma\ (42{,}186.314955)^2 = 1{,}779{,}685{,}169.4824567 \text{ eV} = 1.779685 \times 10^9$$

Differences (macro-block vs fit):

$\Delta m = 33.49773$ (which is **0.07947%** of $m_{\tau,\text{fit}}$), $\Delta E = 2{,}825{,}169.4782$ eV, Relative $\Delta E/E \approx 0.158998\%$

adopting $m_{Z1} = 4096$ shifts the τ energy by ~0.159% relative to the fitted closure, while preserving the clean dyadic structure.

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B.4 Calculating Muon EZZ – Emeon with open Z-Triad (unstable)

$$m_{f,E}(\mu) \equiv m_\mu \equiv m_{EZZ} = \left(m_f^E + m_{Z2} + \Delta m_{int}\right)$$

Where $m_f^E = 46{,}282.314955$

From triad closure defect for Z=2, $n(ZZ) = 562 \times 64 = 35{,}968$

$$m_{Z2} = 35{,}968$$

$$m_{Z2,expected} = 10{,}279.0259996 - 46{,}282.314955 = -36{,}003.2889554$$

Therefore:

$$m_{ZZ} \approx 46{,}282.314955 - 35{,}968 = 10{,}314.314955$$

Energy standard μ rest energy $E_{\tau,\text{meas}} \approx 105.6583755 \times 10^6$ eV, this gives:

$$E_{EZ} = \Gamma\ (10{,}314.314955)^2 = 106{,}385{,}092 \text{ eV} = 106.385092 \times 10^6$$

B.5 calculating Electron $\boldsymbol{m_f^{EZZZ}}$

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

From triad closure defect for Z=3, $n(ZZZ) = 712 \times 64 = 45{,}568$

$$m_{Z\Delta}(e) = 45{,}568$$

$$m_{ZZ} \approx 46{,}282.314955 - 45{,}568 = 714.314955$$

Energy standard μ rest energy $E_{\tau,\text{meas}} \approx 105.6583755 \times 10^6$ eV, this gives:

$$E_{EZ} = \Gamma\ (714.314955)^2 = 510245855 \text{ eV} = 0.510245855 \times 10^6$$

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Appendix C - Energy of the Emeon

This completes the full k = 1 set in the same format:

- **Planar Core:** ~0.411775 MeV
- **Planar Halo:** ~16.7348 MeV
- **Volume Core:** ~0.281074 GeV
- **Volume Halo:** ~72.8298 GeV

This completes the full k = 64 set in the same format:

- **Planar Core:** ~1.6869 GeV
- **Planar Halo:** ~68.5457 GeV
- **Volume Core:** ~73.69 TeV
- **Volume Halo:** ~19.09 PeV

C.1 2D — Planar Energy At k = 1

Area Inventory for Core

$$N_A = \pi r_C^2 = \pi(8\,k\,L_0)^2, \qquad E_{A,C} = \Gamma\frac{N_A}{2} = \frac{\pi}{2}\,r_C^2\text{ eV}$$

$$r_C(1) = 8 \cdot 64 = 512$$

$$E_{A,C} = \frac{\pi}{2}\cdot(512)^2\text{ eV} \approx 411{,}774.8323\text{ eV} \approx 0.4117748\text{ MeV}$$

Area Inventory for Halo

$$N_A = \pi r_H^2 = \pi(51\,k\,L_0)^2, \qquad E_{A,H} = \Gamma\frac{N_A}{2} = \frac{\pi}{2}\,r_H^2\text{ eV}$$

$$r_H(1) = 51 \cdot 64 = 3264$$

$$E_{A,H}(1) = \frac{\pi}{2}(3264)^2\text{ eV} = \frac{\pi}{2}\cdot 10{,}653{,}696\text{ eV} \approx 1.673478654\times 10^7\text{ eV} \approx 16.7348\text{ MeV}$$

C.2 3D — Spherical Energy at k = 1

Volume Inventory for Core

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$$N_V = \frac{4}{3}\pi r_C^3 = \frac{4}{3}\pi(8kL_0)^3, E_{V,C} = \Gamma\frac{N_V}{2} = \frac{2\pi}{3}r_C^3 \text{ eV}$$

$$r_C(1) = 8 \cdot 64 = 512$$

$$E_{V,C}(1) = \frac{2\pi}{3}(512)^3 \text{ eV}$$

$$512^3 = 134{,}217{,}728$$

$$E_{V,C}(1) = \frac{2\pi}{3} \cdot 134{,}217{,}728 \text{ eV} \approx 2.810744 \times 10^8 \text{ eV} \approx 0.2810744 \text{ GeV}$$

Volume Inventory for Halo

$$N_V = \frac{4}{3}\pi r_H^3 = \frac{4}{3}\pi(51kL_0)^3, E_{V,H} = \Gamma\frac{N_V}{2} = \frac{2\pi}{3}r_H^3 \text{ eV}$$

$$r_H(1) = 51 \cdot 64 = 3264$$

$$E_{V,H}(1) = \frac{2\pi}{3}(3264)^3 \text{ eV}$$

$$3264^3 = 34{,}741{,}256{,}704$$

$$E_{V,H}(1) = \frac{2\pi}{3} \cdot 34{,}741{,}256{,}704 \text{ eV} \approx 7.282979 \times 10^{10} \text{ eV} \approx 72.82979 \text{ GeV}$$

C.3 2D — Planar Energy at k = 64

Area Inventory for Core

$$N_A = \pi r_C^2 = \pi(8kL_0)^2, E_{A,C} = \Gamma\frac{N_A}{2} = \frac{\pi}{2}r_C^2 \text{ eV}$$

$$r_C(64) = 8 \cdot 64 \cdot 64 = 32768$$

$$E_{A,C}(64) = \frac{\pi}{2}(32768)^2 \text{ eV}$$

$$32768^2 = 1{,}073{,}741{,}824$$

$$E_{A,C}(64) = \frac{\pi}{2} \cdot 1{,}073{,}741{,}824 \text{ eV} \approx 1.686899394 \times 10^9 \text{ eV} \approx 1.686899 \text{ GeV}$$

Area Inventory for Halo

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$$N_A = \pi r_H^2 = \pi(51kL_0)^2, E_{A,H} = \Gamma\frac{N_A}{2} = \frac{\pi}{2} r_H^2 \text{ eV}$$

$$r_H(64) = 51 \cdot 64 \cdot 64 = 208896$$

$$E_{A,H}(64) = \frac{\pi}{2}(208896)^2 \text{ eV}$$

$$208896^2 = 43{,}637{,}538{,}816$$

$$E_{A,H}(64) = \frac{\pi}{2} \cdot 43{,}637{,}538{,}816 \text{ eV} \approx 6.854568568 \times 10^{10} \text{ eV} \approx 68.54569 \text{ GeV}$$

C.4 3D — Spherical Energy at k = 64

Volume Inventory for Core

$$N_V = \frac{4}{3}\pi r_C^3 = \frac{4}{3}\pi(8kL_0)^3, E_{V,C} = \Gamma\frac{N_V}{2} = \frac{2\pi}{3} r_C^3 \text{ eV}$$

$$r_C(64) = 8 \cdot 64 \cdot 64 = 32768$$

$$E_{V,C}(64) = \frac{2\pi}{3}(32768)^3 \text{ eV}$$

$$32768^3 = 35{,}184{,}372{,}088{,}832$$

$$E_{V,C}(64) = \frac{2\pi}{3} \cdot 35{,}184{,}372{,}088{,}832 \text{ eV} \approx 7.368997658 \times 10^{13} \text{ eV} \approx 73.68998 \text{ TeV}$$

Volume Inventory for Halo

$$N_V = \frac{4}{3}\pi r_H^3 = \frac{4}{3}\pi(51kL_0)^3, E_{V,H} = \Gamma\frac{N_V}{2} = \frac{2\pi}{3} r_H^3 \text{ eV}$$

$$r_H(64) = 51 \cdot 64 \cdot 64 = 208896$$

$$E_{V,H}(64) = \frac{2\pi}{3}(208896)^3 \text{ eV}$$

$$208896^3 = 9{,}115{,}707{,}308{,}507{,}136$$

$$E_{V,H}(64) = \frac{2\pi}{3} \cdot 9{,}115{,}707{,}308{,}507{,}136 \text{ eV} \approx 1.909189274 \times 10^{16} \text{ eV} \approx 19.09189 \text{ PeV}$$

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Appendix D – other mass methods

A.1.2 For Continuous equilateral

$$m_e = 24L_0\sqrt{\frac{\sqrt{3}}{8}} = 714.9154$$

A.1.3 Integer-height lattice

$$m_e = 238.1260 + 476.5207 + 0 = 714.6467$$

Triangle height

$$a_E \equiv r_C(k=1) = 8\,L_0 = 512$$

$$H(a) \equiv \text{round}\left(\frac{\sqrt{3}}{2}a\right) = \text{round}\,(443.4050) = 443$$

Triangle inventory:

$$N_E = \frac{1}{2}\cdot(512)(443) = 113{,}408$$

$$m_f^E = \sqrt{\frac{N_E}{2}} = \sqrt{\frac{113{,}408}{2}} = 238.1260$$

Z-triad curvature term for an equilateral triad:

$$a_Z \equiv r_C(k=2) = 16\,L_0 = 1024$$

$$H(a) \equiv \text{round}\left(\frac{\sqrt{3}}{2}a\right) = \text{round}(886.8100) = 887$$

$$N_{ZZZ} = \frac{1}{2}\cdot(887)(1024) = 454{,}144$$

$$\Delta m_{Z\Delta} = \sqrt{\frac{N_{ZZZ}}{2}} = \sqrt{\frac{454{,}144}{2}} = 476.5207$$

No interaction correction at this layer:

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$$\boxed{\Delta m_{int} = 0}$$