Ledger 2.0 — Unified Locks & Predictions By Evan Wesley

Version: v2.0 (frozen)

What this is. One-stop, versioned ledger of *simple rational locks* (fractions) for precision constants across sectors. Each lock is an exact fraction p/q. We keep it simple and falsifiable.

Acceptance rule (for locking). Prefer tiny denominators ("low-bit") and values hugging current centrals. We tag predictions separately.

A. Core electroweak & QCD locks (frozen)

Quantity	Fraction p/q	Decimal
Effective weak mixing ($\sin^2\theta_W$, at M_Z)	$\frac{25}{108}$	0.231481481…
Strong coupling ($\alpha_s(M_Z)$)	$\frac{23}{195}$	0.117948718…
Wolfenstein λ	$\frac{9}{40}$	0.225
Wolfenstein A	$\frac{21}{25}$	0.84

B. CKM shape (extras, frozen)

Quantity	Fraction	Decimal
$\bar{\rho}$	$\frac{3}{20}$	0.15
$\bar{\eta}$	$\frac{7}{20}$	0.35
$\sin 2\beta$	$\frac{7}{10}$	0.7
$\lvert V_{ud}\rvert$	$\frac{37}{38}$	0.9736842105…
$\lvert V_{us}\rvert$	$\frac{11}{49}$	0.2244897959…
$\lvert V_{us}\rvert/\lvert V_{ud}\rvert$	$\frac{3}{13}$	0.2307692308…
$\lvert\varepsilon_K\rvert$	$\frac{2}{897}$ $(\times 10^{-3})$	0.0022296544…
$f_K^{\pm}/f_\pi^{\pm}$	$\frac{31}{26}$	1.192307692…

C. Neutrino mixing (3ν, NO reference, frozen)

Quantity	Fraction	Decimal
$\sin^2\theta_{12}$	$\frac{31}{101}$	$0.306930693\ldots$
$\sin^2\theta_{13}$	$\frac{1}{45}$	$0.022222222\ldots$
$\sin^2\theta_{23}$	$\frac{5}{9}$	$0.555555555\ldots$
Ratio $r \equiv \Delta m^2_{21}/\lvert\Delta m^2_{3\ell}\rvert$	$\frac{13}{440}$	$0.0295454545\ldots$

D. Cosmology (Planck-like ridge, frozen)

Quantity	Fraction	Decimal
Matter density Ω_m	$\frac{63}{200}$	0.315
Vacuum density Ω_Λ (flat)	$\frac{137}{200}$	0.685
Spectral index n_s	$\frac{28}{29}$	$0.965517241\ldots$
σ_8	$\frac{73}{90}$	$0.811111111\ldots$
$\Omega_b h^2$	$\frac{14}{625}$	0.0224
$\Omega_c h^2$	$\frac{3}{25}$	0.12
Hubble fraction $h \equiv H_0/100$	$\frac{31}{46}$	$0.673913043\ldots$
Baryon fraction $f_b = \Omega_b/\Omega_m$	$\frac{5}{32}$	0.15625

E. Rare-decay add-ons (kept as observables)

Channel	Lock	Meaning
$\mathcal{B}(K^+ \to \pi^+ \nu\bar{\nu})$ (exp.)	13×10^{-11}	Central-as-lock (NA62-style combined)
$\mathcal{B}(K^+ \to \pi^+ \nu\bar{\nu})$ (SM)	$\frac{89}{10} \times 10^{-11}$	8.9×10^{-11} (Fibonacci 89)
$\mathcal{B}(B_s \to \mu^+\mu^-)$ (exp.)	$\frac{10}{3} \times 10^{-9}$	$3.333\ldots\times10^{-9}$
$\mathcal{B}(B_s \to \mu^+\mu^-)$ (SM)	$\frac{91}{25} \times 10^{-10}$	3.64×10^{-9}
Ratio R =exp/SM (for $B_s \to \mu\mu$)	$\frac{11}{12}$	$0.9167\ldots$

F. Definitions used by predictions

We will *not* use α as input. Define two composite ratios purely from the frozen locks:

$$R_1 \equiv \frac{\lambda}{\sin^2\theta_{13}} = \frac{9/40}{1/45} = \frac{81}{8} = 10.125, \qquad R_2 \equiv \frac{1}{\alpha_s \sin^2\theta_W} = \frac{195}{23}\cdot\frac{108}{25} = \frac{4212}{115} \approx 36.6260869565.$$

G. Predictions (frozen with Ledger v2.0)

G.1 α from other locks — primary (simple, 4 terms)

$$\boxed{\alpha^{-1}_{\text{simple-4}} = 10\,R_1 \;+\; R_2 \;-\; A \;-\; \frac{1}{8\,R_2^2}}$$

Inputs: $A = \frac{21}{25}$, $R_1 = \frac{81}{8}$, $R_2 = \frac{4212}{115}$.
Exact value:

$$\alpha^{-1}_{\text{simple-4}} = \frac{11183280301129}{81608342400} = 137.0359937752\ldots$$

(This already beats a ± 0.002 accuracy target by $\sim 370\times$.)

G.2 α from other locks — precision (10 terms)

$$\boxed{\alpha^{-1}_{\text{precision-10}} = 10R_1 + R_2 - \tfrac{5}{6} - \tfrac{1}{R_1} + \tfrac{3}{R_2} + \tfrac{4}{R_1R_2} - \tfrac{1}{R_2^2} + \tfrac{3}{R_2^3} + \tfrac{13}{R_2^5} + \tfrac{25}{R_2^7}}$$

Exact value:

$$\alpha^{-1}_{\text{precision-10}} = \frac{3706389430173180885951455403 61}{270468304126841790343176 1920} = 137.0359991770049232\ldots$$

This lands within a few parts in 10^{12} of the CODATA-22 central ($\alpha^{-1} \approx 137.035999177$), using only our other frozen fractions.

Comment. These are empirical algebraic predictions combining quantities at different renormalization scales; they are not derived from the SM Lagrangian. We freeze them here to be tested against future updates to $\lambda, \sin^2\theta_{13}, \alpha_s, \sin^2\theta_W$ and CODATA α.

H. Version & philosophy

Version. This document is frozen as **v2.0**. Any change (new lock or edit) becomes v2.1, v2.2, ... and so on.

Freeze & score. We never overwrite history; we publish a new version when promoting better locks. The point is to keep the integers tiny and the predictions falsifiable.

Vein primes. Many locks deliberately reuse the small-prime threads $\{5, 7, 11, 13, 23, 29, 89\}$ and simple power structures (e.g., $2^a 5^b$), echoing modular/partition "Ramanujan" patterns.