

# Swirl–String Theory Rosetta Stone v0.6: Translation Guide for Symbols, Macros, and Constants

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## Abstract

This Rosetta note provides a structured translation layer between Swirl–String Theory (SST) and mainstream formalisms in gravity, fluid dynamics, and quantum field theory, without relying on its historical VAM presentation. At the kinematic level it fixes the canonical SST identities

$$\rho_E (\text{J m}^{-3}) = \frac{1}{2} \rho_f \|\mathbf{v}_\odot\|^2, \quad \rho_m (\text{kg m}^{-3}) = \rho_E / c^2, \quad K_{(\text{kg m}^{-3} \text{ s})} = \frac{\rho_{\text{core}} r_c}{\|\mathbf{v}_\odot\|_{r=r_c}}, \quad \rho_f (\text{kg m}^{-3}) = K \Omega,$$

$$\frac{D}{Dt}(R^2 \omega) = 0 \quad (\text{incompressible, inviscid, barotropic, no reconnection}).$$

and shows how these coincide with standard kinetic-energy density, effective mass density, and coarse-grained angular rates in incompressible, inviscid flow. On the chronometric/metric layer, the Swirl–Clock sector is mapped to khronon/Einstein–Æther constructions and to weak-field GR via an explicit identification of the analogue potential  $\Phi_{\text{SST}}$  and the corresponding PPN/GW constraints. On the fluid and topological layers,  $\mathbf{v}_\odot$ ,  $\omega$ , and the helicity functional are matched to superfluid velocity fields, vorticity, and Hopf/Skyrme-type solitons, while the knot-based energy functional  $\mathcal{E}_{\text{eff}}$  is aligned with known topological energy bounds. On the gauge/quantum layer, multi-director swirl symmetries are related to  $\mathfrak{su}(3) \oplus \mathfrak{su}(2) \oplus \mathfrak{u}(1)$  gauge structure and to photon-like excitations in analogue-media language. The document supplies a compact macro set (`\rhoF`, `\rhoE`, `\rhoM`, `\rhoC`, `\vswirl`, `\vnorm`) and layer-by-layer dictionaries so that SST manuscripts can be read, checked, and compared directly within mainstream relativity, fluid, and field-theoretic frameworks, with all dimensional scalings and published numerical calibrations preserved.

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# 1 Rosetta Concordance of SST and Mainstream Terminology

Rosetta Card: GR/PPN/GW  $\rightarrow$  Swirl-String Theory (SST)

**Domain:** weak-field, stationary backgrounds; lensing, Shapiro delay, PPN.

## Symbol Dictionary:

GR object	SST counterpart	Notes
$g_{\mu\nu}$ (weak field)	analogue metric via Swirl-Clock	matter propagation sector
$\Phi$ (Newtonian potential)	$\Phi_{\text{SST}}$ from swirl energy fraction	defined below
$T^{\mu\nu}$	swirl stress ( $\rho_E, p_{\text{swirl}}, \dots$ )	barotropic, inviscid
$c$	$c$	calibrated to luminal signals

## EOM / Metric Map (linearized):

$$ds_{\text{GR}}^2 \approx - \left( 1 + \frac{2\Phi}{c^2} \right) c^2 dt^2 + \left( 1 - \frac{2\gamma\Phi}{c^2} \right) d\mathbf{x}^2.$$

Define the local swirl energy density and maximum energy density

$$U_{\text{swirl}} = \frac{1}{2}\rho_f \|\mathbf{v}_\odot\|^2, \quad U_{\text{max}} = \rho_{\text{core}} c^2, \quad \chi_{\text{swirl}} = \frac{U_{\text{swirl}}}{U_{\text{max}}} \text{ (dimensionless),}$$

and map

$$g_{tt} = -(1 - \chi_{\text{swirl}}), \quad g_{ij} = (1 + \gamma \chi_{\text{swirl}}) \delta_{ij}.$$

Matching coefficients gives

$$\boxed{\Phi_{\text{SST}} \equiv -\frac{U_{\text{swirl}}}{2\rho_{\text{core}}}} \Rightarrow \frac{2\Phi_{\text{SST}}}{c^2} = -\chi_{\text{swirl}}, \quad \gamma = 1 \text{ (Calibration).}$$

*Dimensional check:*  $[U_{\text{swirl}}] = \text{J/m}^3$ ,  $[\rho_{\text{core}}] = \text{kg/m}^3$ , so  $U_{\text{swirl}}/\rho_{\text{core}}$  has units  $\text{J/kg} = \text{m}^2/\text{s}^2$ , as required for  $\Phi$ .

## Numerical validation (SST constants):

$$\begin{aligned} \kappa &= 2\pi r_c \|\mathbf{v}_\odot\| = 9.68 \times 10^{-9} \text{ m/s}, \quad U_{\text{swirl}} = \frac{1}{2}\rho_f \|\mathbf{v}_\odot\|^2 = 4.19 \times 10^5 \text{ J/m}^3, \\ U_{\text{max}} &= \rho_{\text{core}} c^2 = 3.50 \times 10^{35} \text{ J/m}^3, \quad \chi_{\text{swirl}} = U_{\text{swirl}}/U_{\text{max}} = 1.20 \times 10^{-30}, \\ \Phi_{\text{SST}} &= -\frac{U_{\text{swirl}}}{2\rho_{\text{core}}} = -5.38 \times 10^{-14} \text{ m}^2/\text{s}^2, \quad \left| \frac{2\Phi_{\text{SST}}}{c^2} \right| = 1.20 \times 10^{-30}. \end{aligned}$$

Known-limit check:  $|\chi_{\text{swirl}}| \ll 1 \Rightarrow$  PPN weak-field holds with  $\gamma = 1$ .

## Predictions & Falsifiers

- Lensing/Shapiro from  $\Phi_{\text{SST}}$  matches GR to  $\mathcal{O}(\chi_{\text{swirl}})$ ; deviations scale with spatial gradients of  $U_{\text{swirl}}$ .
- High-frequency GW propagation luminal (Calib.)  $\Rightarrow$  multi-messenger bounds satisfied.
- Falsifier: any measured  $\gamma \neq 1$  at  $10^{-5}$ – $10^{-6}$  in quasi-static fields contradicts this mapping.

**Status:** Calibration

**Version:** v0.5.10

**Domain:** radiation sector; vacuum/linear media analogues.

**Dictionary:**

EM object	SST counterpart	Notes
$A_\mu$	director phase gradient $\partial_\mu \theta$	Abelian sector
$F_{\mu\nu} = \partial_\mu A_\nu - \partial_\nu A_\mu$	swirl curvature of director field	circulation quantized
Charge $q$	knot/link index (topological)	integer invariants
Flux quantum	$\kappa = 2\pi r_c \ \mathbf{v}_\odot\ $	$9.68 \times 10^{-9} \text{ m}^2/\text{s}$
Poynting $\mathbf{S}$	energy flux of Kelvin-swirl waves	$\sim U_{\text{swirl}} \mathbf{v}_{\text{ph}}$

**Lagrangian/EOM map (linearized, uniform background):**

$$\mathcal{L}_{\text{EM}} = -\frac{1}{4} F_{\mu\nu} F^{\mu\nu} \longleftrightarrow \mathcal{L}_{\text{SST}}^{(\theta)} = \frac{1}{2} \left[ \frac{1}{c^2} (\partial_t \theta)^2 - |\nabla \theta|^2 \right] U_{\text{max}},$$

yielding the wave equation

$$\partial_t^2 \theta - c^2 \nabla^2 \theta = 0 \quad (\text{calibrated luminal phase speed}).$$

In inhomogeneous multi-director fields, polarization-dependent phase shifts (vacuum-like birefringence) enter via curvature of the director manifold.

**Numerical anchor:**

circulation quantum  $\kappa = 9.68 \times 10^{-9} \text{ m}^2/\text{s}$  fixes the smallest swirl-flux unit consistent with  $r_c$  and  $\mathbf{v}_\odot$ .

**Dimensional checks:**

$\mathcal{L}_{\text{SST}}^{(\theta)}$  has units of energy density by the factor  $U_{\text{max}}$ .

**Predictions & Falsifiers:**

- Plane-wave dispersion  $\omega = ck$  in uniform regions; gradients in  $\theta$  produce tiny polarization-dependent delays  $\propto \nabla^2 \theta / U_{\text{max}}$ .
- Falsifier: vacuum birefringence above current bounds in high-energy astrophysical spectra would contradict the calibration.

**Status:** Canonical (kinematics) / Research (multi-director birefringence)

**Version:** v0.5.10

## Rosetta Card: Einstein–Æther/Khronon → SST (Swirl–Clock)

**Domain:** preferred-frame EFTs; GW constraints; PPN.

### Dictionary:

EA field	SST counterpart	Notes
Unit timelike $u^\mu$	normalized Swirl–Clock four-velocity	picks foliation
$c_i$ couplings	effective foliation elasticities	mapped by calibration
$c_T$ (spin-2 GW speed)	luminal by construction	enforce $c_{13} = c_1 + c_3 \simeq 0$

### Action map (symbolic):

$$S_{\text{æ}} = \frac{1}{16\pi G} \int d^4x \sqrt{-g} \left[ -R - K_{ab}^{mn} \nabla^a u_m \nabla^b u_n + \lambda (u^\mu u_\mu + 1) \right],$$

$$K_{ab}^{mn} = c_1 g_{ab} g^{mn} + c_2 \delta_a^m \delta_b^n + c_3 \delta_a^n \delta_b^m + c_4 u_a u_b g^{mn}.$$

### GW calibration:

impose  $c_{13} = 0 \Rightarrow c_T^2 = 1$  (luminal spin-2). Spin-1 and spin-0 mode speeds are functions of  $c_i$  (see table in source); choose parameter ranges that avoid instabilities/Čerenkov bounds.

### Numerical anchor (GW170817 class):

$$|c_T - 1| \lesssim 10^{-15} \Rightarrow |c_{13}| \lesssim 10^{-15} \quad (\text{imposed}).$$

### Predictions & Falsifiers:

- With  $c_{13} = 0$ , SST’s Swirl–Clock foliation is consistent with coincident GW–EM arrival.
- Dipole/monopole radiation channels are suppressed by calibration choices; detection at current pulsar-timing sensitivity would falsify this mapping.

**Status:** Calibration (GW speed) / Research (spin-0/1 sector)

**Version:** SST-Rosetta v0.5.10

## Chronometric and Metric Layer

SST Term	Mainstream Equivalent	Context / Reference
Swirl clock $S_t^\odot$	Khronon / preferred-foliation scalar $T(x)$	Einstein–Æther, Hořava–Lifshitz gravity [1, 2]
Swirl time dilation $d\tau = dt \sqrt{1 - \ \mathbf{v}_\odot\ ^2/c^2}$	Æther lapse factor $N$	ADM decomposition
Chronos–Kelvin invariant	Kelvin’s circulation / helicity conservation	Classical fluid invariants [7]
Swirl-foliation metric $g_{\mu\nu}^{(\text{swirl})}$	Acoustic / analogue-gravity metric	Unruh–Visser emergent metric [12]

## Fluid–Dynamic and Field Layer

SST Term	Mainstream Name / Concept	Relation
Swirl velocity field $\mathbf{v}_\odot$	Superfluid phase-gradient velocity	$\mathbf{v} = (\hbar/m) \nabla \phi$ analogue
Effective density $\rho_f$	Superfluid or effective mass density	Incompressible limit
Swirl energy density $\rho_E$	Kinetic-energy density $\frac{1}{2} \rho v^2$	Barotropic flow
Swirl pressure gradient	Hydrodynamic pressure field $p(\rho)$	Euler acceleration source
Swirl tensor $\omega_{ij} = \partial_i v_j - \partial_j v_i$	Vorticity tensor	Identical operator

## Topological and Knot Layer

SST Term	Mainstream Equivalent	Connection
Swirl string	Quantized vortex filament / Nielsen–Olesen string	Fluid–string duality
Knot-energy functional $\mathcal{E}_{\text{eff}} = \alpha C + \beta L + \gamma \mathcal{H}$	Moffatt–Faddeev–Skyrme functional	Topological soliton energy
Swirl helicity $\mathcal{H} = \int \mathbf{v} \cdot \boldsymbol{\omega} dV$	Fluid / magnetic helicity	Linkage and twist invariant [3, 4]
Hopf charge $H_{\text{vortex}}$	Hopf invariant	$\pi_3(S^2)$ topological index [5]
Golden-layer factor $\varphi^{-2k}$	Discrete-scale-invariance factor	Renormalization-group analog

## Gauge and Quantum Layer

SST Concept	Mainstream Analogue	Mapping
Multi-director swirl symmetry	Gauge algebra $\mathfrak{su}(3) \oplus \mathfrak{su}(2) \oplus \mathfrak{u}(1)$	Emergent gauge structure
Swirl-string excitations	Unknotted field quanta / gauge bosons	Photon, gluon, ... as unknots
Chiral swirl orientation	CPT-conjugate sectors	Matter–antimatter dual
Swirl potential $\Phi = \frac{1}{2} \ \mathbf{v}_\odot\ ^2$	Kinetic / gravitational potential analog	Replaces GR curvature scalar
Mass functional $M = \frac{1}{\varphi} \frac{4}{\alpha} (\frac{1}{2} \rho_f \ \mathbf{v}_\odot\ ^2 V)$	Energy–mass equivalence	Mechanical derivation of rest mass

## Gravitational and Large-Scale Layer

SST Term	Mainstream Name	Comment
Swirl-gravity constant $G_{\text{swirl}}$	Newtonian $G$ (effective)	Derived from swirl mechanics
Pressure-well curvature	Gravitational potential well	Fluid-mechanical analog of curvature
Swirl potential waves	Gravitational / acoustic waves	Analogue-gravity mode
Torsional shocks	Nonlinear vorticity / spin-density waves	Possible new radiation class

## Thermodynamic and Entropic Layer

SST Feature	Mainstream Analog	Interpretation
Swirl entropy growth	Enstrophy / helicity cascade	Entropy production in turbulence
Swirl-dissipation arrow	Thermodynamic arrow of time	Irreversibility via reconnection
Coherence factor $\xi(n) = 1 + \beta \log n$	Quantum-coherence correction	Many-body renormalization analog

## Summary Table

SST Structural Layer	Physics Discipline	Closest Mainstream Equivalent
Chronometric	Lorentz-violating gravity	Khronon field / preferred foliation
Fluid–Dynamic	Superfluid hydrodynamics	Velocity, pressure, density fields
Topological	Soliton and knot theory	Hopfions, Skyrmions, helicity
Gauge–Quantum	Quantum field theory	Gauge algebra and field quanta
Gravitational	Analogue gravity / GR limit	Metric potentials, $G$ analog
Thermodynamic	Non-equilibrium physics	Entropic and causal arrows

## Scale-dependent Effective Densities in SST

Effective densities (house style).

$$\rho_f \equiv \text{effective fluid density}, \quad \rho_E \equiv \frac{1}{2} \rho_f \|\mathbf{v}_\odot\|^2 \quad (\text{swirl energy density}),$$

$$\rho_m \equiv \rho_E / c^2 \quad (\text{mass-equivalent density}).$$

Background value:  $\rho_f^{\text{bg}} \approx 7.0 \times 10^{-7} \text{ kg m}^{-3}$ . Core (material) density:  $\rho_{\text{core}} \approx 3.8934358267 \times 10^{18} \text{ kg m}^{-3}$ . Hence core energy density

$$\rho_E^{\text{core}} = \rho_{\text{core}} c^2 \approx 3.499 \times 10^{35} \text{ J m}^{-3}.$$

**Radial profile (phenomenology).** It is convenient to model the near-core energy density with an exponential relaxation to the background:

$$\rho_E(r) = \rho_E^{\text{bg}} + (\rho_E^{\text{core}} - \rho_E^{\text{bg}}) e^{-r/r_*},$$

with a microscopic decay scale  $r_*$  (fit parameter). This empirical profile does not replace the exact tube energetics below.

**String energetics (Rankine core + irrotational envelope).** For a core of radius  $r_c$  and length  $\ell$  with solid-body rotation  $v_\phi(r) = \Omega r$  for  $r \leq r_c$ ,

$$E_{\text{core}} = \int_0^{r_c} \frac{1}{2} \rho_f (\Omega r)^2 (2\pi r \ell) dr = \frac{\pi}{4} \rho_f \Omega^2 r_c^4 \ell.$$

Outside the core,  $v_\phi(r) = \Gamma / (2\pi r)$  with  $\Gamma = 2\pi \Omega r_c^2$ , giving the slender-tube envelope term

$$E_{\text{env}} \simeq \frac{\rho_f \Gamma^2}{4\pi} \ell \ln \frac{R}{r_c},$$

where  $R$  is an outer cutoff set by the nearest boundary or neighboring strings. Both contributions are standard in vortex-tube energetics (core + Biot-Savart envelope).

**Coarse-graining.** At macroscales, we use the canonical identity

$$K = \frac{\rho_{\text{core}} r_c}{\|\mathbf{v}_\odot\|_{r=r_c}} = \frac{\rho_{\text{core}} r_c}{\|\mathbf{v}_\odot\|_{r=r_c}}, \quad \rho_f = K \Omega_{\text{leaf}}.$$

where  $\Omega_{\text{leaf}}$  is a coarse-grained (leaf-averaged) angular rate. Numerically,  $\Omega_{\text{leaf}} \sim 10^{-4} \text{ s}^{-1}$  in the Canon fit; it must not be confused with the microscopic core rate below.

## 2 Layered Time Scaling from Swirl Dynamics

Adopt the SR-like local rule

$$\frac{d\tau}{dt} = \sqrt{1 - \frac{v_\phi^2(r)}{c^2}}.$$

With a Rankine profile,

$$v_\phi(r) = \begin{cases} \Omega_{\text{core}} r, & r \leq r_c, \\ \frac{\Gamma}{2\pi r}, & r \geq r_c, \end{cases} \quad \Gamma = 2\pi \Omega_{\text{core}} r_c^2.$$

Continuity at  $r = r_c$  gives  $v_\phi(r_c) = \Omega_{\text{core}} r_c \equiv \|\mathbf{v}_\odot\|_{r=r_c} = \|\mathbf{v}_\odot\|_{r=r_c}$ , hence

$$\Omega_{\text{core}} = \frac{\|\mathbf{v}_\odot\|_{r=r_c}}{r_c} = \frac{\|\mathbf{v}_\odot\|_{r=r_c}}{r_c} \approx \frac{1.09384563 \times 10^6}{1.40897017 \times 10^{-15}} \approx 7.763 \times 10^{20} \text{ s}^{-1}.$$

Thus

$$\frac{d\tau}{dt} = \begin{cases} \sqrt{1 - \frac{\Omega_{\text{core}}^2 r^2}{c^2}}, & r \leq r_c, \\ \sqrt{1 - \frac{\Gamma^2}{4\pi^2 c^2 r^2}}, & r \geq r_c. \end{cases}$$

The earlier ansatz  $d\tau/d\bar{t} = e^{-r/r_c}$  can be used only as a phenomenological fit; it does not follow from the SR-like form unless one imposes a special  $v_\phi(r)$  inconsistent with Rankine.

### 3 SST–VAM Translation and Constant Overlaps (Extended)

#### Chronos–Kelvin invariant

$$\frac{D}{Dt}(R^2\omega) = 0 \quad (\text{incompressible, inviscid, barotropic, no reconnection}).$$

(Kelvin/Helmholtz circulation conservation in SST wording; see [8, 9, 6, 7].)

#### Temporal Ontology in SST

We distinguish absolute parameter time  $\mathcal{N}$  (preferred foliation label), external observer time  $\tau$ , and internal clocks carried by swirl strings: a phase accumulator  $S(t)$  and a loop “proper time”  $T_s$ . These appear in the field equations and separate global synchronization from local rotational dynamics.

$\mathcal{N}$	Absolute time (foliation)	Global causal parameter
$\nu_0$	Now-point	Localized synchronization label
$\tau$	External/chronos time	Measured time of external observer
$S(t)$	Swirl clock	Internal phase memory along a string
$T_s$	String proper time	Loop-duration functional
$\mathbb{K}$	Kairos event	Topological/phase transition moment

#### Fields, kinematics, operators (mapping)

VAM (legacy)	SST (house)	Meaning	Units	Overlap
“æther time”	absolute time parametrization	foliation time label	—	Yes
$T(x)$	$T(x)$	scalar clock field	—	Yes
$u_\mu$ (unit “æther” vector)	$u_\mu$ (unit time-like field)	$u_\mu = \partial_\mu T / \sqrt{-g^{\alpha\beta} \partial_\alpha T \partial_\beta T}$	—	Yes
“vortex line(s)”	swirl string(s)	object name only	—	Yes
$B_{\mu\nu}, H_{\mu\nu\rho}$	same	Kalb–Ramond 2-form; $H = \partial_{[\mu} B_{\nu\rho]}$	—	Yes
$W_\mu$	$W_\mu$	coarse-grained frame connection	—	Yes
$C(K), L(K), \mathcal{H}(K)$	same	crossing #, ropelength, hyperbolic proxy	—	Yes

#### Densities, velocities, coarse–graining (mapping)

VAM (legacy)	SST (macro)	Meaning	Units	Overlap
$\rho_0, \rho_{\text{æ}}^{(\text{fluid})}, \rho_{\text{æ}}^{(\text{vacuum})}$	$\rho_f, \rho_f^{\text{bg}}$ or $\rho_f^{(0)}$	effective fluid density	$\text{kg m}^{-3}$	Yes
$\rho_{\text{æ}}^{(\text{core})}, \rho_{\text{æ}}^{(\text{mass})}$	$\rho_{\text{core}}$	core/material density	$\text{kg m}^{-3}$	Yes
$\rho_{\text{æ}}^{(\text{energy})}$	$\rho_E$ (or $\rho_{\text{core}} c^2$ )	energy density	$\text{J m}^{-3}$	Yes
$C_e$ (tangential)	$\ \mathbf{v}_\odot\ _{r=r_c}$	characteristic swirl speed ( $= \ \mathbf{v}_\odot\ $ at $r = r_c$ )	$\text{m s}^{-1}$	Yes
$C_e$ (field form)	$\mathbf{v}_\odot$	swirl-velocity <i>vector field</i>	$\text{m s}^{-1}$	Add
$C_e$ (scalar use)	$\ \mathbf{v}_\odot\ _{r=r_c}$	core magnitude of $\mathbf{v}_\odot$	$\text{m s}^{-1}$	Add
$K = \frac{\rho^{(\text{mass})} r_c}{C_e}$	$K = \frac{\rho_{\text{core}} r_c}{\ \mathbf{v}_\odot\ _{r=r_c}}$	coarse–graining coefficient	$\text{kg m}^{-3} \text{s}$	Add
$\Omega$	$\Omega$	leaf angular rate	$\text{s}^{-1}$	Yes

#### Global scales and bounds

VAM (legacy)	SST (house)	Meaning	Units	Overlap
$F^{\text{max}}$ (Coulomb)	$F_{\text{EM}}^{\text{max}}$	Coulomb-sector bound	N	Yes
$F_{\text{gr}}^{\text{max}}$ (Universal)	$F_{\text{G}}^{\text{max}}$	gravitational/universal bound	N	Yes
$\Gamma$	$\Gamma$	loop circulation	$\text{m}^2 \text{s}^{-1}$	Yes
$\Omega_R, \Omega_c$	same	outer rigid vs. core spin	$\text{s}^{-1}$	Yes

## Numeric overlaps (published values)

Quantity	Symbol (SST)	Value	Units
Characteristic swirl speed	$\ \mathbf{v}_\odot\ _{r=r_c} (\equiv \ \mathbf{v}_\odot\ _{r=r_c})$	1,093,845.63	$\text{m s}^{-1}$
Core radius	$r_c$	$1.40897017 \times 10^{-15}$	m
Core density	$\rho_{\text{core}}$	$3.8934358266918687 \times 10^{18}$	$\text{kg m}^{-3}$
Background density	$\rho_f^{\text{bg}}$	$7.0 \times 10^{-7}$	$\text{kg m}^{-3}$
Max Coulomb force	$F_{\text{EM}}^{\text{max}}$	29.053507	N
Max universal force	$F_{\text{G}}^{\text{max}}$	$3.02563 \times 10^{43}$	N

## Macro glossary (house style)

Use the macros to avoid drift:

$\rho_f$  (effective density),  $\rho_E$  (energy density),  $\rho_m$  (mass-equivalent)

$\rho_{\text{core}}$  (core density),  $\mathbf{v}_\odot$  (swirl velocity vector),  $\|\mathbf{v}_\odot\| = \|\mathbf{v}_\odot\|$  (speed magnitude at a point).

*Energy vs mass-equivalent (clarification).*  $\rho_E$  is an *energy density*;  $\rho_m = \rho_E / c^2$  is the corresponding local mass-equivalent. *Note.*  $\rho_{\text{core}}$  is a *calibration constant*. The mass-equivalent density is a *field*  $\rho_m(x) = \rho_E(x) / c^2$ . In the core-saturation evaluation  $\rho_E^{\text{core}} = \rho_{\text{core}} c^2$ , one has  $\rho_m^{\text{core}} = \rho_{\text{core}}$ .

## Prose guardrails (rebrand policy)

Use *foliation* and *swirl string(s)* in narrative text. Reserve legacy words (“æther”, “vortex”) strictly for quoting historical titles or citations. Retain *vorticity* as standard.

## Sentence rewrites (examples)

Legacy: “The æther sector fixes the vortex core density.”

SST: “The *foliation* sector fixes the *core density*  $\rho_{\text{core}}$  of the swirl string.”

Legacy: “Kelvin’s vortex theorem implies conserved  $R^2\omega$ .”

SST: “Kelvin’s *circulation* theorem implies  $\frac{D}{Dt}(R^2\omega) = 0$  under incompressible, inviscid, barotropic flow.”

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