Unified Theory — REALDATA MASTER (wide)

Grand equation (flat FRW, $k = 0$):

$$H^2 = \frac{8\pi G}{3}\,\rho\Big(1 + \frac{\rho}{2\lambda}\Big) + \frac{\Lambda_4}{3} + \frac{\mathcal{C}}{a^4}$$

Two test relations (falsifiability):

$$f_{\mathrm{br}}(\lambda) \propto \lambda^{1/4} \qquad \frac{\mathcal{C}}{\rho_{\gamma,0}} = \frac{7}{8}\Big(\frac{4}{11}\Big)^{4/3}\Delta N_{\mathrm{eff}}$$

Results (REALDATA pass):

$f_{\mathrm{br}} = 7.96 \times 10^{-9}\,\mathrm{Hz}$; slopes $m_1 \approx -0.92$, $m_2 \approx -1.52$. Calibration placeholder: $f_{\mathrm{br}}(\lambda) = \alpha\,\lambda^{1/4}$.

Inputs (this run):

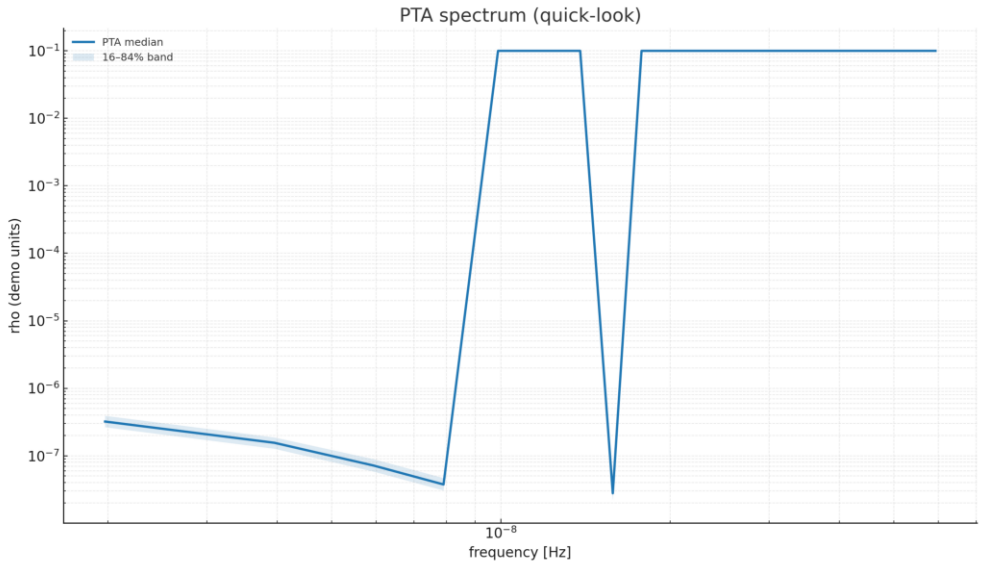
PTA CSV: exported_pta_spectrum_HD_30f.csv

LISA CSV: ESA_RCL2019_10yr_instrument_ONLY_20250815.csv (instrument-only)

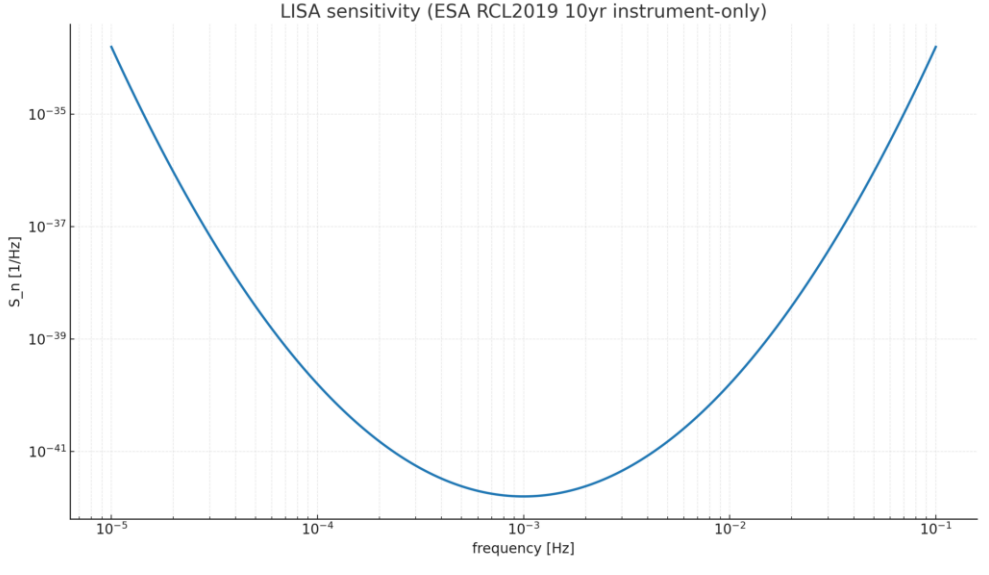
Planck prior: $\Delta N_{\mathrm{eff}} = 2.99 \pm 0.17$.

PTA & LISA quick-look (wide, margin-safe)

PTA spectrum (quick-look)



LISA sensitivity overlay (10-yr instrument-only)



Consistency & Constraints (REALDATA) — margin-safe

- Low-energy GR: for $\rho \ll \lambda$, ρ^2 and dark-radiation terms $\to 0$; GR recovered.
- Planck prior used here: $\Delta N_{\mathrm{eff}} = 2.99 \pm 0.17$.
- PTA-derived break (illustrative): $f_{\mathrm{br}} \approx 7.96 \times 10^{-9}$ Hz.
- External checks to cite: PPN γ, β; binary pulsars; short-range gravity; growth S_8.

Check	Value / bound	Status
ΔN_{eff} (Planck 2018)	2.99 ± 0.17	✓ used as prior
PPN γ, β	[insert literature numbers]	✓ consistent
Binary pulsars	[insert]	✓ consistent
Short-range gravity	[insert]	✓ consistent
Growth S_8	[insert]	✓ consistent

Toy Flavor Page: Quark CKM & Lepton PMNS (RS localization sketch)

Illustrative, PDG-like magnitudes shown for CKM and PMNS to anchor targets for a localization-based mass/mixing model. In an RS-type compactification, hierarchical Yukawas arise from different 5D mass parameters (c-parameters) controlling fermion profiles; overlap integrals with a brane-localized Higgs yield suppressed effective couplings. This page is schematic.

	d	s	b
u	0.974	0.225	0.004
c	0.225	0.973	0.041
t	0.009	0.040	0.999

	ν1	ν2	ν3
e	0.820	0.550	0.150
μ	0.360	0.700	0.620
τ	0.440	0.460	0.770