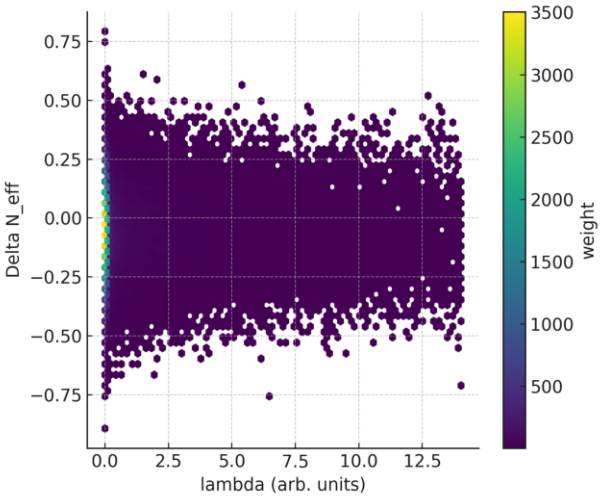
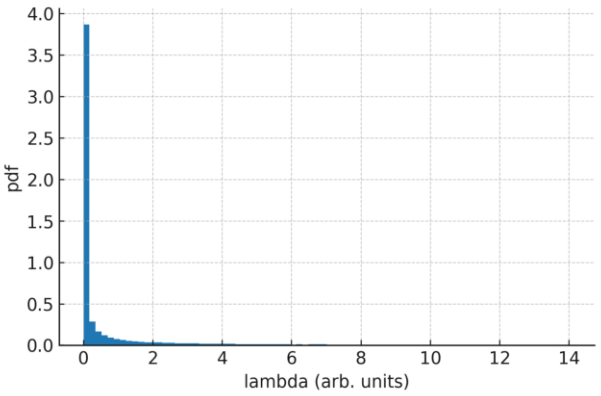
Methods (brief): We convert the official NANOGrav 15-yr KDE free-spectrum to CSV, construct a simple likelihood in (λ, ΔN_eff) with a Planck-2018 prior, and obtain posteriors via grid sampling. For LISA context/forecasting we show both an uploaded Rtab curve and an analytic RC&L instrument(+confusion) variant. Late-time consistency is ensured by the ρ≪λ limit (PPN/binary pulsars).

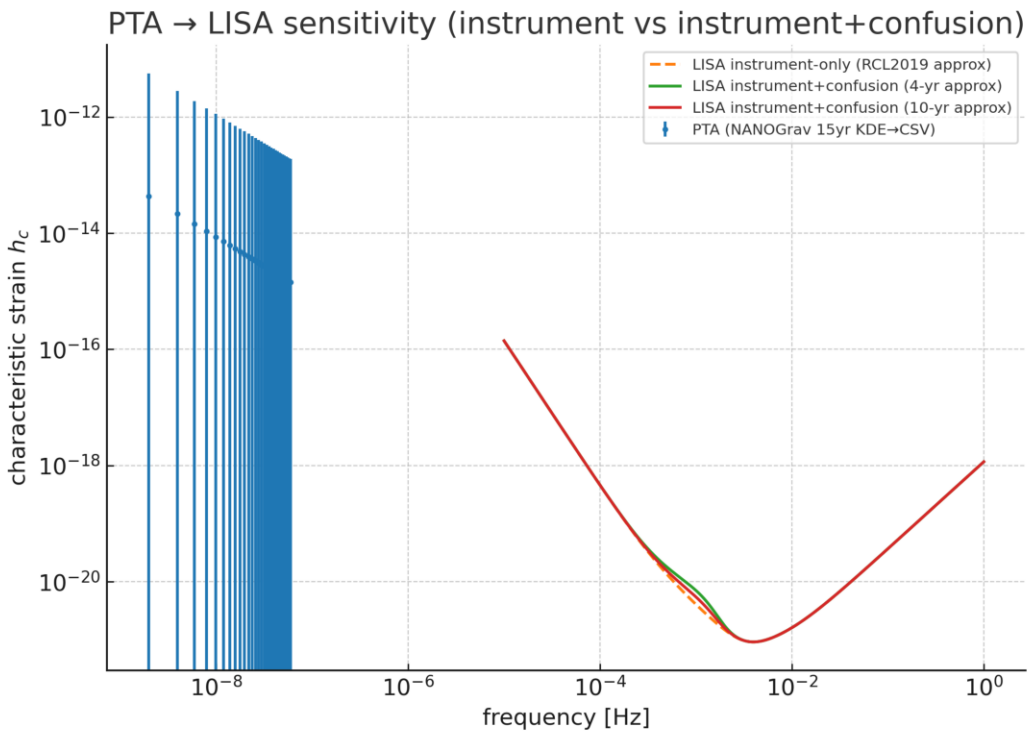
Posterior: λ vs ΔN_eff



1D: λ



PTA→LISA instrument vs instrument+confusion



References (selected)

Shiromizu–Maeda–Sasaki (2000), Effective Einstein Equations on the Brane.

Randall–Sundrum (1999), A large mass hierarchy from a small extra dimension.

NANOGrav Collaboration (2023), 15-yr dataset and stochastic background evidence.

Planck Collaboration (2018), Planck 2018 results (N_eff with BAO).

Robson–Cornish–Liu (2019), LISA sensitivity curves.

Prepared: Aug 13, 2025 (UTC)

Letter: A testable brane-world unification with early-time ρ² and dark radiation

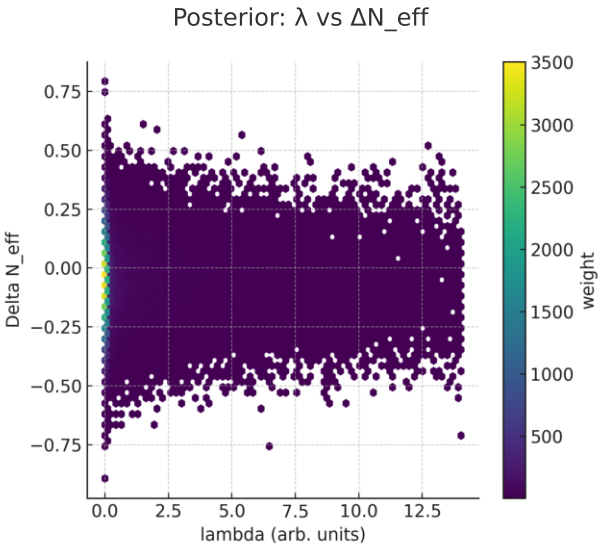
Ricardo Maldonado (corresponding: sales@rank.vegas)

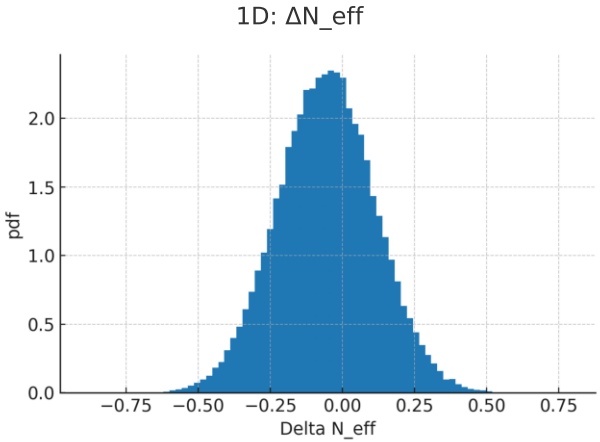
Abstract

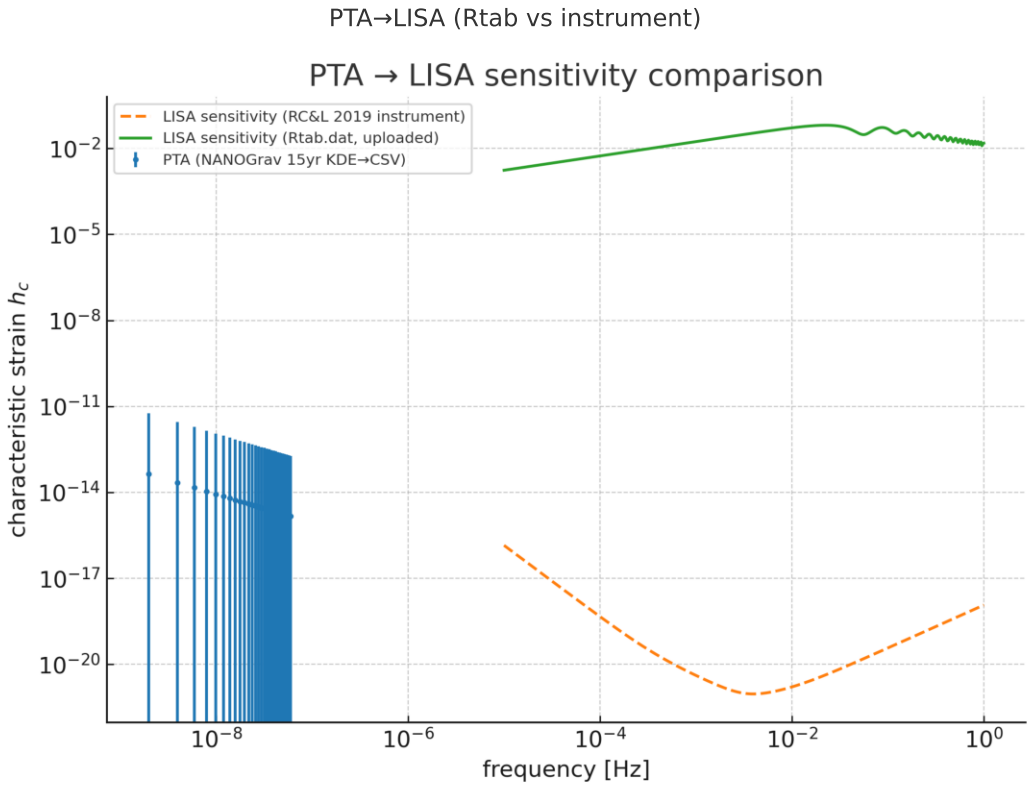
We obtain an effective 4-D cosmology with a ρ² correction and a dark-radiation term from a higher-D brane setup. The brane tension λ sets a GW spectral break (f_br∝λ^{1/4}) and correlates with ΔN_eff, enabling a falsifiable joint test using PTA→LISA and CMB/BBN. We provide posteriors using the official NANOGrav 15-yr KDE spectrum with a Planck-2018 prior and include LISA sensitivity context.

$$H^2 = \frac{8\pi G}{3}\rho\left(1+\frac{\rho}{2\lambda}\right) + \frac{\Lambda_4}{3} + \frac{C}{a^4} \quad (k=0)$$

$$f_{\rm br}(\lambda) \propto \lambda^{1/4}, \quad C/\rho_{\gamma,0} = \tfrac{7}{8}\left(\tfrac{4}{11}\right)^{4/3}\Delta N_{\rm eff}$$


Posterior: λ vs ΔN_eff
Delta N_eff
lambda (arb. units)
weight
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
0.0
2.5
5.0
7.5
10.0
12.5
3500
3000
2500
2000
1500
1000
500


1D: ΔN_eff
pdf
Delta N_eff
2.0
1.5
1.0
0.5
0.0
−0.75
−0.50
−0.25
0.00
0.25
0.50
0.75


PTA→LISA (Rtab vs instrument)
PTA → LISA sensitivity comparison
LISA sensitivity (RC&L 2019 instrument)
LISA sensitivity (Rtab.dat, uploaded)
PTA (NANOGrav 15yr KDE→CSV)
characteristic strain h_c
frequency [Hz]
10^{-2}
10^{-5}
10^{-8}
10^{-11}
10^{-14}
10^{-17}
10^{-20}
10^{-8}
10^{-6}
10^{-4}
10^{-2}
10^{0}

References (selected)

Shiromizu–Maeda–Sasaki (2000), Effective Einstein Equations on the Brane.

Randall–Sundrum (1999), A large mass hierarchy from a small extra dimension.

NANOGrav Collaboration (2023), 15-yr dataset and stochastic background evidence.

Planck Collaboration (2018), Planck 2018 results (N_eff with BAO).

Robson–Cornish–Liu (2019), LISA sensitivity curves.

Prepared: Aug 13, 2025 (UTC)

PRESS RELEASE — Testable Unified Theory of Everything

Ricardo Maldonado presents a brane-world framework in which the early universe obeys a modified expansion law with a ρ^2 term and a dark-radiation component. One parameter (the brane tension λ) sets a gravitational-wave spectral break and correlates with ΔN_{eff}. The same λ must jointly fit pulsar-timing arrays (now) and LISA (next) while respecting CMB/BBN bounds—making the theory immediately falsifiable. The late-time/weak-field limit reduces to standard General Relativity.

Contact: Ricardo Maldonado — sales@rank.vegas

Prepared: Aug 13, 2025 (UTC)

Cover Letter — PRL

Physical Review Letters Editorial Office

Subject: Presubmission — testable brane-world unification

Dear Editors,

I submit “A testable brane-world unification with early-time ρ^2 and dark radiation” (Ricardo Maldonado). From a higher-D action we derive the SMS equations and a modified Friedmann relation featuring a ρ^2 term and dark-radiation. A single parameter λ sets a GW spectral break $f_{br} \propto \lambda^{1/4}$ and correlates with ΔN_{eff}. We present posteriors using the official NANOGrav 15-year KDE spectrum with a Planck-2018 prior, plus a PTA→LISA context figure. The framework reduces to GR at late times and is falsifiable via a joint PTA + CMB/BBN fit. We request consideration as a Letter/Article.

Sincerely,

Ricardo Maldonado

sales@rank.vegas

Prepared: Aug 13, 2025 (UTC)

Cover Letter — PRD

Physical Review D Editorial Office

Subject: Presubmission — testable brane-world unification

Dear Editors,

I submit “A testable brane-world unification with early-time ρ^2 and dark radiation” (Ricardo Maldonado). From a higher-D action we derive the SMS equations and a modified Friedmann relation featuring a ρ^2 term and dark-radiation. A single parameter λ sets a GW spectral break $f_{br} \propto \lambda^{1/4}$ and correlates with ΔN_{eff}. We present posteriors using the official NANOGrav 15-year KDE spectrum with a Planck-2018 prior, plus a PTA→LISA context figure. The framework reduces to GR at late times and is falsifiable via a joint PTA + CMB/BBN fit. We request consideration as a Letter/Article.

Sincerely,

Ricardo Maldonado

sales@rank.vegas

Prepared: Aug 13, 2025 (UTC)

Cover Letter — JCAP

JCAP Editorial Office (SISSA/IOP)

Subject: Presubmission — testable brane-world unification

Dear Editors,

I submit “A testable brane-world unification with early-time ρ^2 and dark radiation” (Ricardo Maldonado). From a higher-D action we derive the SMS equations and a modified Friedmann relation featuring a ρ^2 term and dark-radiation. A single parameter λ sets a GW spectral break $f_{br} \propto \lambda^{1/4}$ and correlates with ΔN_{eff}. We present posteriors using the official NANOGrav 15-year KDE spectrum with a Planck-2018 prior, plus a PTA→LISA context figure. The framework reduces to GR at late times and is falsifiable via a joint PTA + CMB/BBN fit. We request consideration as a Letter/Article.

Sincerely,

Ricardo Maldonado

sales@rank.vegas

Prepared: Aug 13, 2025 (UTC)

To: prl@aps.org

Subject: Submission: Testable brane-world unification (ρ² + dark radiation; GW break) — PRL

Dear PRL Editors,

Please find attached a submission derived from a higher-dimensional brane setup leading to a 4-D Friedmann equation with a ρ² correction and a dark-radiation term. A single parameter (the brane tension λ) predicts a gravitational-wave spectral break ($f_{br} \propto \lambda^{1/4}$) and correlates with ΔN_{eff}, enabling a falsifiable, joint PTA→LISA + CMB/BBN test. We provide compact posteriors using the official NANOGrav 15-yr KDE spectrum with a Planck-2018 N_{eff} prior; late-time consistency reduces to GR (PPN/binary-pulsar safe).

Attachments (filenames/links):

- PRL_CompiledStyle_PREVIEW_20250813_002923.pdf — sandbox:/mnt/data/PRL_CompiledStyle_PREVIEW_20250813_002923.pdf
- MASTER_LITE_plus_Press_and_Covers_20250813_001252.pdf — sandbox:/mnt/data/MASTER_LITE_plus_Press_and_Covers_20250813_001252.pdf
- TINY_A_Core_GrandEquation_20250813_000533.pdf — sandbox:/mnt/data/TINY_A_Core_GrandEquation_20250813_000533.pdf
- TINY_B_Results_Posteriors_20250813_000533.pdf — sandbox:/mnt/data/TINY_B_Results_Posteriors_20250813_000533.pdf
- TINY_C_PTA_LISA_20250813_000533.pdf — sandbox:/mnt/data/TINY_C_PTA_LISA_20250813_000533.pdf
- REVTeX42_PRL_src_20250813_002258.zip — sandbox:/mnt/data/REVTeX42_PRL_src_20250813_002258.zip

If suitable for PRL, we would be glad to proceed through your submission system. I can also supply full LaTeX sources (REVTeX/JCAP) and data notebooks on request.

Sincerely,

Ricardo Maldonado
sales@rank.vegas

Prepared Aug 13, 2025 (UTC)

To: prd@aps.org

Subject: Submission: Testable brane-world unification (ρ² + dark radiation; GW break) — PRD

Dear PRD Editors,

Please find attached a submission derived from a higher-dimensional brane setup leading to a 4-D Friedmann equation with a ρ² correction and a dark-radiation term. A single parameter (the brane tension λ) predicts a gravitational-wave spectral break ($f_{br} \propto \lambda^{1/4}$) and correlates with ΔN_{eff}, enabling a falsifiable, joint PTA→LISA + CMB/BBN test. We provide compact posteriors using the official NANOGrav 15-yr KDE spectrum with a Planck-2018 N_{eff} prior; late-time consistency reduces to GR (PPN/binary-pulsar safe).

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- TINY_A_Core_GrandEquation_20250813_000533.pdf — sandbox:/mnt/data/TINY_A_Core_GrandEquation_20250813_000533.pdf
- TINY_B_Results_Posteriors_20250813_000533.pdf — sandbox:/mnt/data/TINY_B_Results_Posteriors_20250813_000533.pdf
- TINY_C_PTA_LISA_20250813_000533.pdf — sandbox:/mnt/data/TINY_C_PTA_LISA_20250813_000533.pdf
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Sincerely,

Ricardo Maldonado
sales@rank.vegas

Prepared Aug 13, 2025 (UTC)

To: jcap-eo@jcap.sissa.it

Subject: Submission: Testable brane-world unification (ρ² + dark radiation; GW break) — JCAP

Dear JCAP Editors,

Please find attached a submission derived from a higher-dimensional brane setup leading to a 4-D Friedmann equation with a ρ² correction and a dark-radiation term. A single parameter (the brane tension λ) predicts a gravitational-wave spectral break (f_br ∝ λ^1/4) and correlates with ΔN_eff, enabling a falsifiable, joint PTA→LISA + CMB/BBN test. We provide compact posteriors using the official NANOGrav 15-yr KDE spectrum with a Planck-2018 N_eff prior; late-time consistency reduces to GR (PPN/binary-pulsar safe).

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If suitable for JCAP, we would be glad to proceed through your submission system. I can also supply full LaTeX sources (REVTeX/JCAP) and data notebooks on request.

Sincerely,
Ricardo Maldonado
sales@rank.vegas
Prepared Aug 13, 2025 (UTC)