

Cover Letter — Physical Review Letters

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Subject: Presubmission: Brane-cosmology GW break $f_{\text{br}}(\lambda) \leftrightarrow \Delta N_{\text{eff}}$ (testable, single-parameter)

Dear Editors,

Please consider the manuscript “Unified Brane-Cosmology: A Testable Route to Unification.”

We show that a higher-D brane setup yields a 4D Friedmann equation with a high-energy p^2 correction and a dark-radiation term (C/a^4). A single parameter (brane tension λ) sets a stochastic-GW spectral break $f_{\text{br}} \propto \lambda^{1/4}$ and correlates with ΔN_{eff} , providing a falsifiable bridge from theory to data (PTA→LISA with CMB/BBN priors).

Highlights:

- Concise, general-interest result: one parameter (λ) links a GW spectral break to early-universe ΔN_{eff} .
- Near-term falsifiability across PTA→LISA; consistency with CMB/BBN required.

We attach an 18-page All-in-One summary (Unicode), a Results Two-Pager with a real-anchored preview fit, and a small DataKit for reproducibility. We will submit the full manuscript via your online system.

Sincerely,

Ricardo Maldonado (sales@rank.vegas)