

Cover Letter — JCAP (Journal of Cosmology and Astroparticle Physics)

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Subject: Presubmission: Brane-cosmology ρ^2 era with GW break tied to λ and linked to ΔN_{eff}

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 ρ^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:

- Cosmology-centric framing with joint GW+CMB/BBN inference target.
- Clear path to extended likelihood and parameter constraints.

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)