

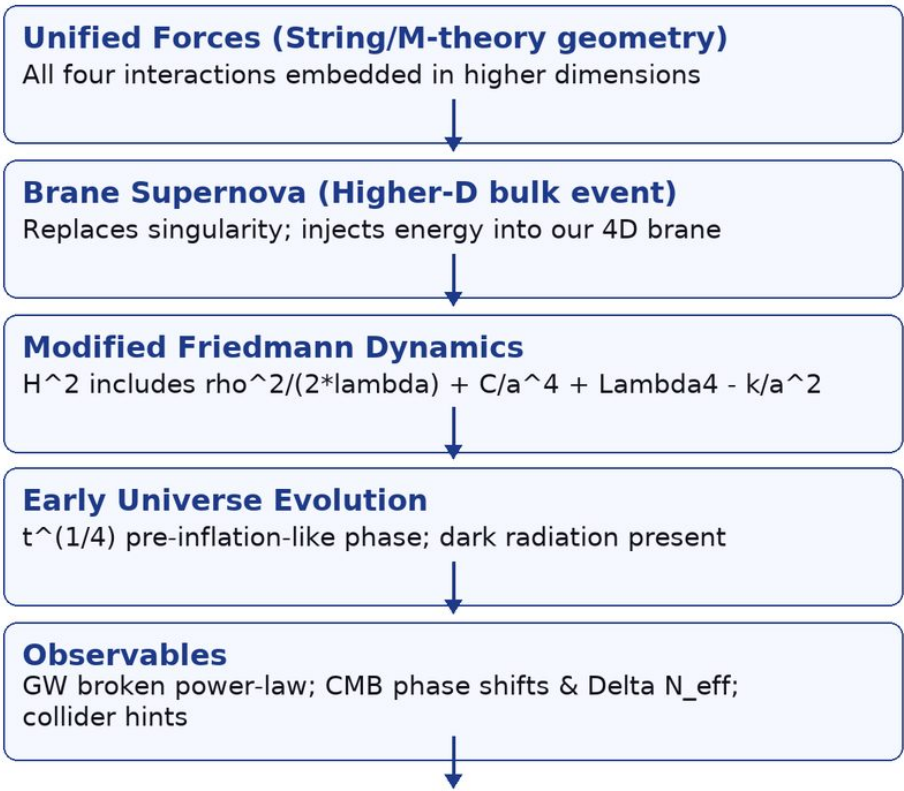
# Unified Theory of Everything — Executive Brief (MINI)

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## At a Glance

- Higher-dimensional geometry unifies gravity, electromagnetism, strong & weak forces.
- Big Bang singularity replaced by a higher-D brane supernova (physical origin).
- Effective cosmology includes a high-energy  $\rho^2$  term and dark-radiation  $C/a^4$ .
- Model is falsifiable via GW (PTAs/LISA), CMB (CMB-S4/LiteBIRD), and collider/precision tests.

## Evolution Flow — From Forces to Observables



## Key Equations (images to ensure compatibility)

### Core Equations

$$H^2 = (8\pi G/3) * \rho * (1 + \rho/(2\lambda)) + C/a^4 - k/a^2 + \lambda/3$$

ASCII-safe notation:  $\rho$  (r),  $\lambda$  (l), C (dark radiation),  $\lambda/3$ , curvature k.

### Core Equations

$$a(t) \sim t^{1/4} \quad (\text{high-energy } \rho^2\text{-dominated era})$$

Early-time expansion law when  $\rho^2/(2\lambda)$  dominates in brane cosmology.

# Testable Predictions — At a Glance

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## Gravitational Waves

- Broken power-law  $\Omega_{\text{GW}}(f)$  from brane-blast dynamics
- Low-frequency (PTAs) + mid-band (LISA) complementarity
- Amplitude-break relation provides unique fingerprint

## CMB Imprints

- Modified early expansion via  $\rho^2$ -term leaves phase shifts
- Mild non-Gaussianity; possible low- $l$  anomalies
- $\Delta N_{\text{eff}} \sim 0.2\text{-}0.4$  consistent with dark radiation

## Particle/Collider

- Warped-dimension effects near unification thresholds
- No Planck-suppression anomalies; running couplings shift
- Look for missing energy channels consistent with bulk leakage