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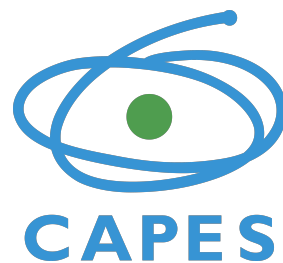
MINISTÉRIO DA
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Cosmological models for $f(R, T) - \Lambda(\phi)$ gravity

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Inflation 2025, Paris



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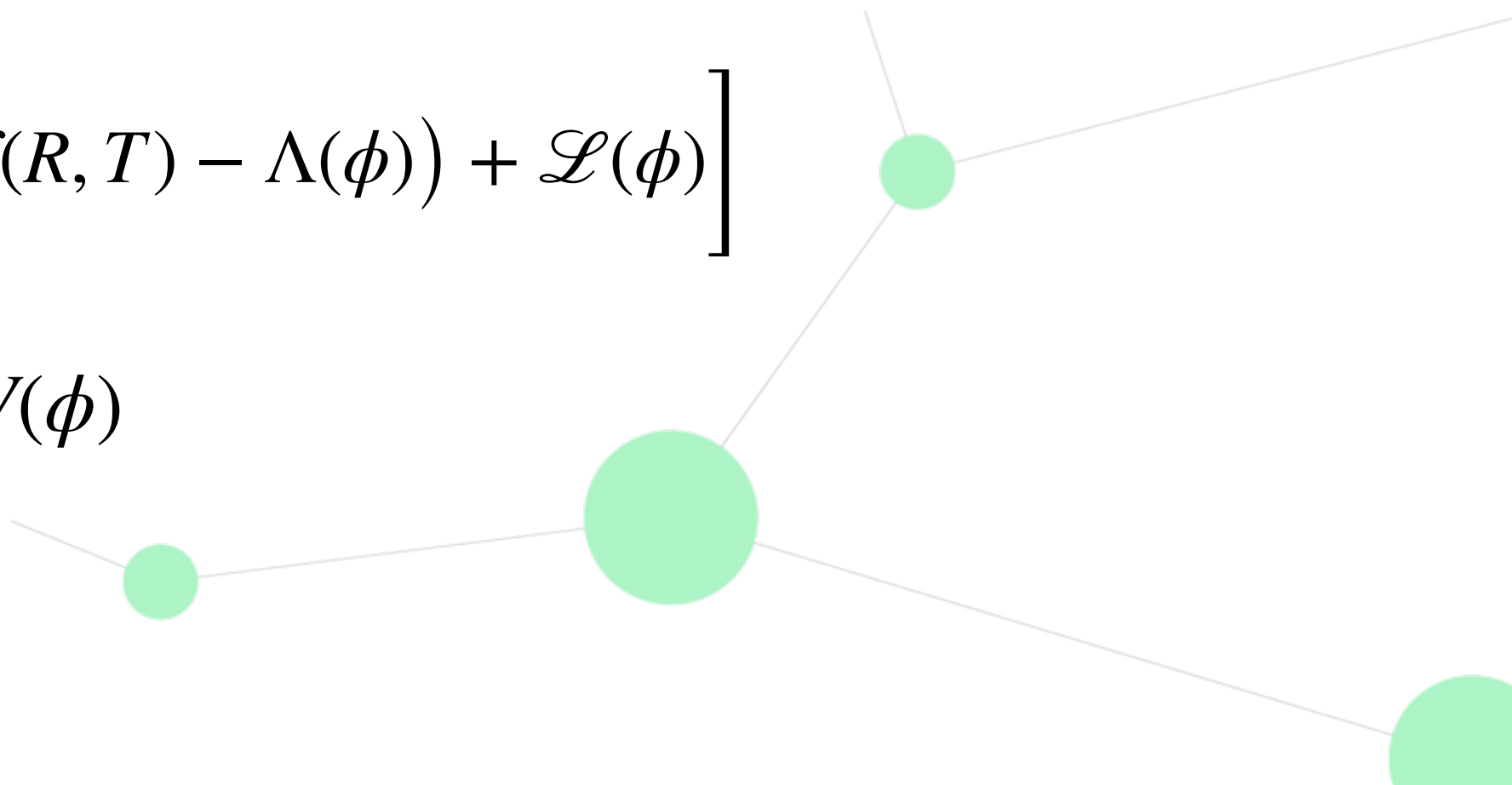
Goals of arXiv:2303.16714 [gr-qc]

- * Introduce the coupling between $f(R, T) - \Lambda(\phi)$
- * Develop a new analytic method to construct cosmological models in this framework.
- * Provide viable inflationary scenarios driven by a single scalar field
- * Derive predictions for the scalar spectral index n_s and tensor-to-scalar ratio r compatible with Planck CMB data

$f(R, T) - \Lambda(\phi)$ gravity

Action

$$S = \int d^4x \sqrt{-g} \left[\frac{1}{2} (f(R, T) - \Lambda(\phi)) + \mathcal{L}(\phi) \right]$$

$$\mathcal{L} = \frac{1}{2} \partial_\mu \phi \partial^\mu \phi - V(\phi)$$


$$f(R, T) = f(R) + f(T) = -\frac{R}{4} + f(T)$$

$$T = \rho - 3p$$

$$\Lambda(\phi) = c_0 + c_2 H^2(\phi) + c_4 H^4(\phi)$$

Friedmann and Field Equations

$$3H^2 = \left(\frac{1}{2} - 2f_T\right)\dot{\phi}^2 - f(T) + V(\phi) + \frac{\Lambda}{2}$$

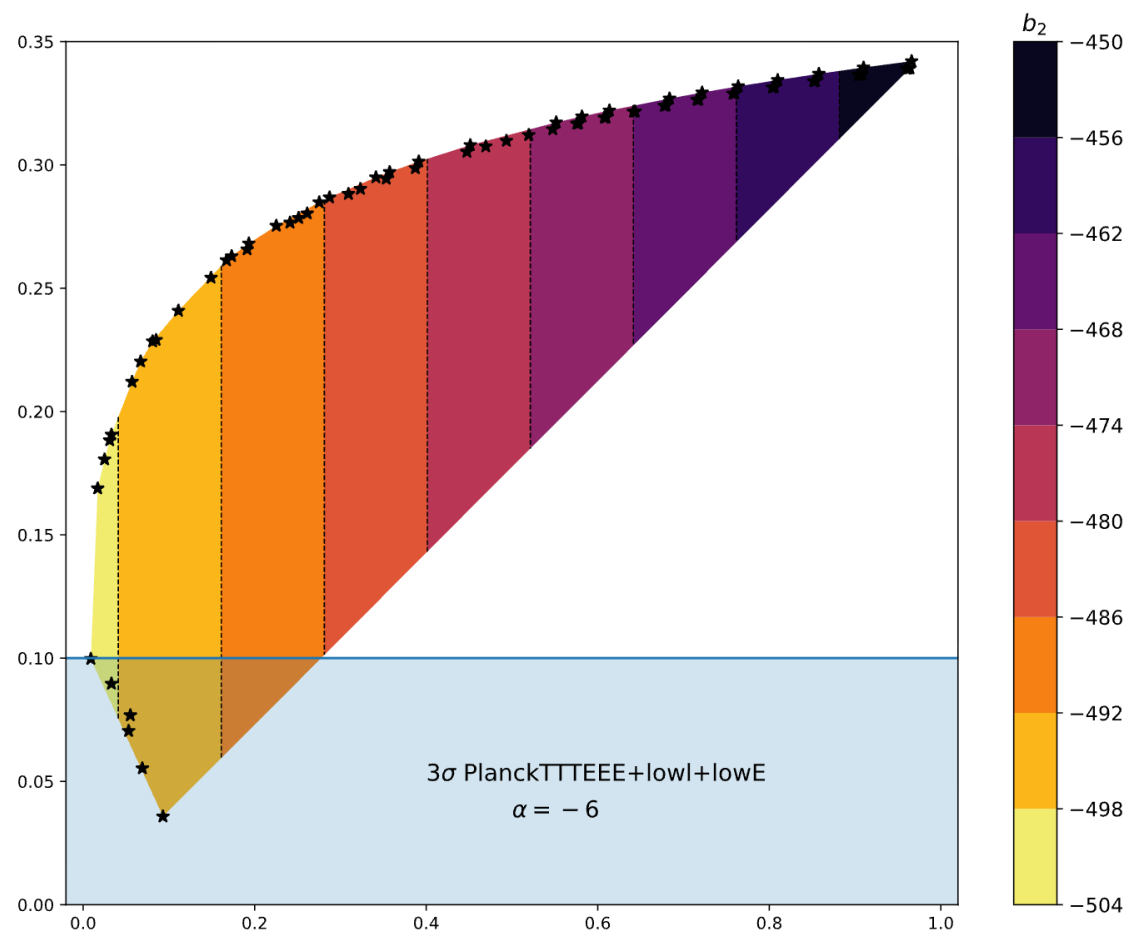
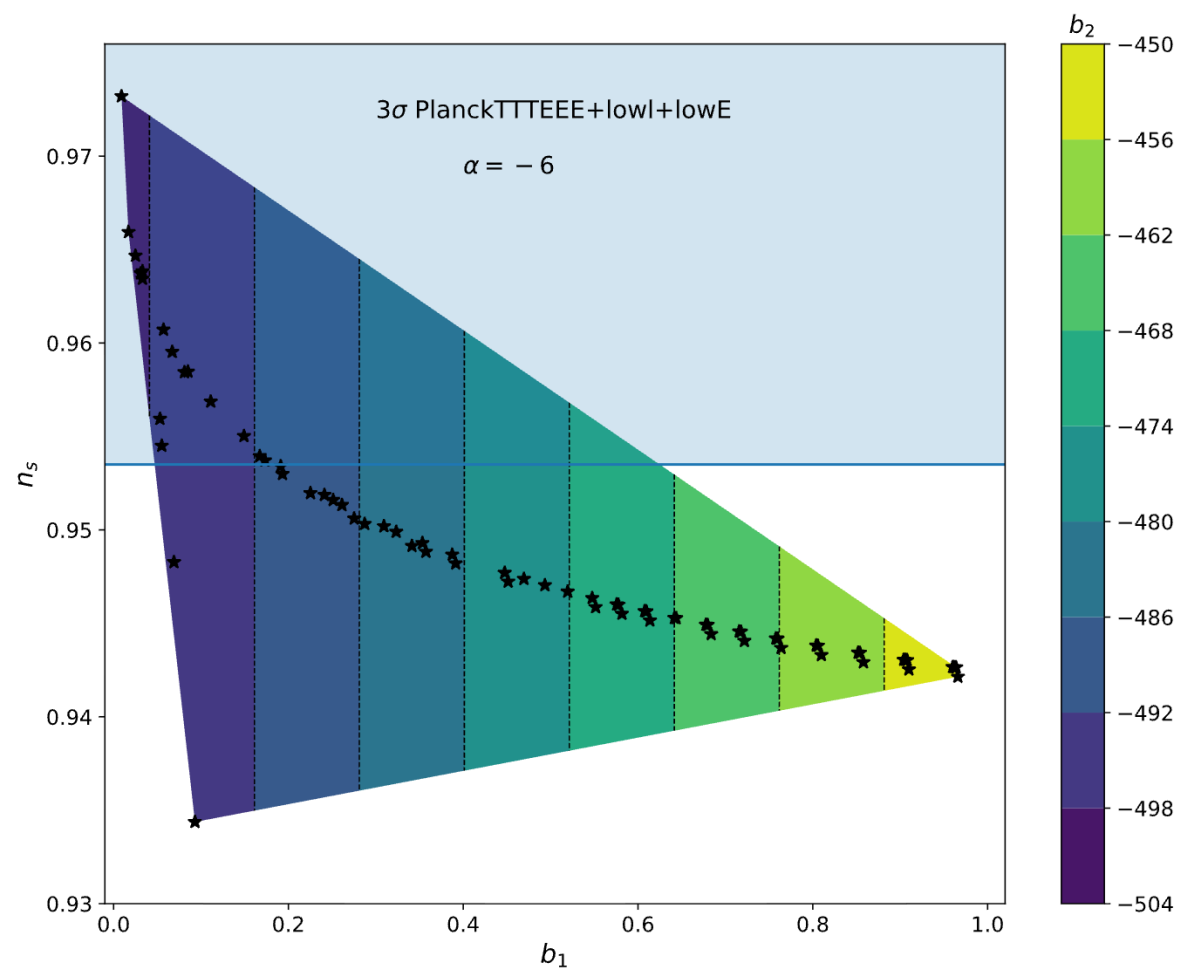
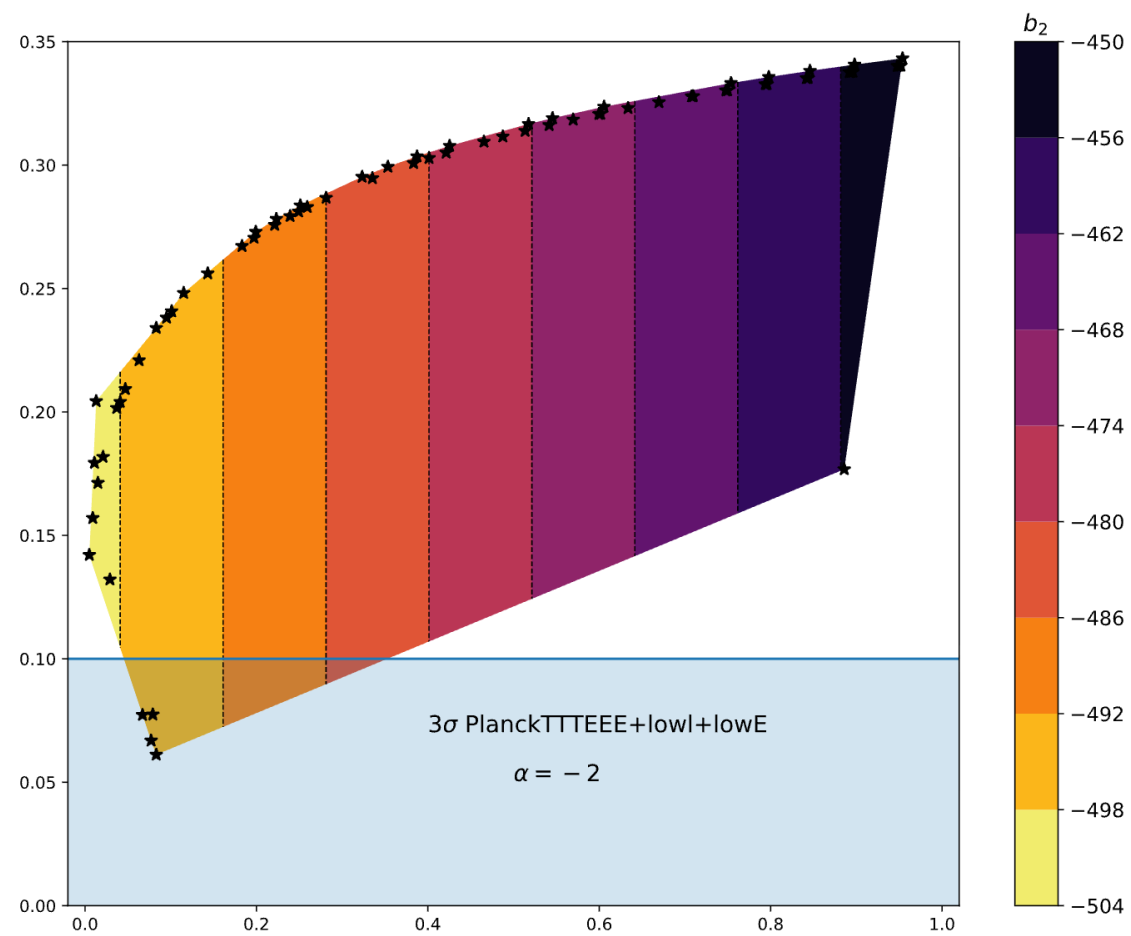
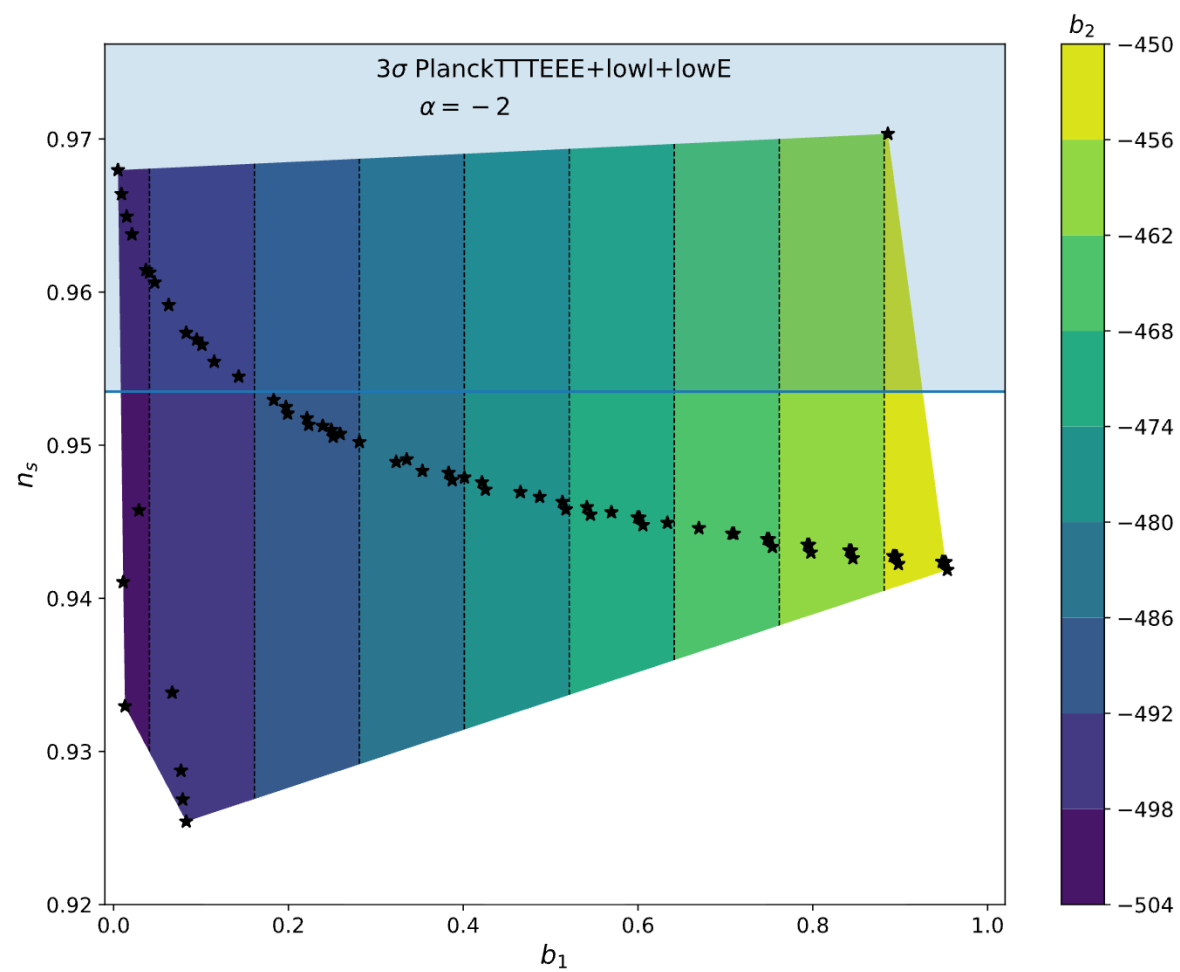
$$\dot{H} = -(1 - 2f_T)\dot{\phi}^2$$

$$(1 - 2f_T)(\ddot{\phi} + 3H\dot{\phi}) - 2\dot{f}_T\dot{\phi} + (1 - 4f_T)\tilde{V}_\phi = 0$$

$$\tilde{V} = V + \frac{\Lambda}{2}$$

Two analytic models

$$f_{1\phi} = \alpha T_\phi; \quad f_{2\phi} = (\alpha - \beta b_1 \sin(\phi)) T_\phi$$





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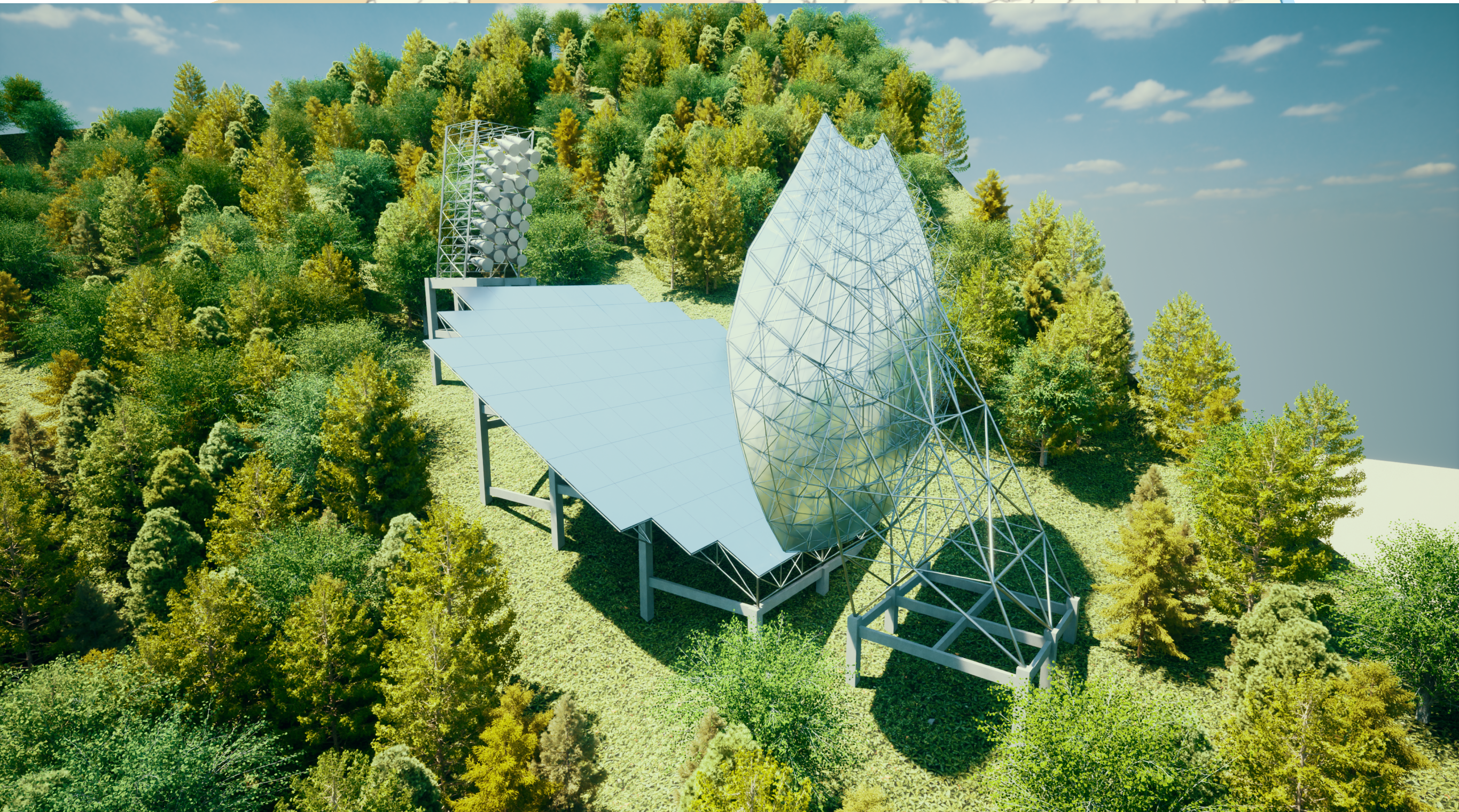
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Merci!

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