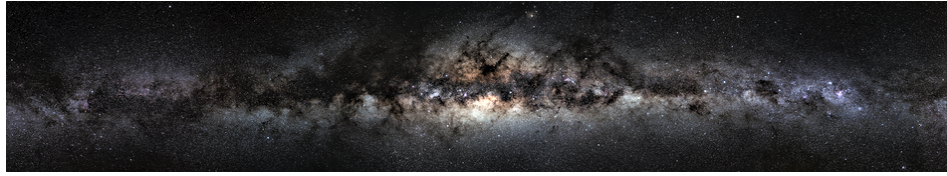


# Dark Sectors of Astroparticle Physics (AstroDark-2021): Axions, Neutrinos, Black Holes and Gravitational Waves



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Type: Poster

## Holographic $\Upsilon$ beta function in de Sitter space

*Tuesday, 7 December 2021 08:20 (30 minutes)*

We investigate the resummation of infrared logarithms in inflationary Universe from holographic perspective. By the renormalization group, we derive gravitational Fokker-Planck and Langevin equations as the effective theory at the Horizon scale. We investigate the time evolution of the de Sitter entropy  $S = \Upsilon\pi/G_N H^2(t)$ .  $H(t)$  is the time dependent effective Hubble parameter and  $G_N$  is the Newton's constant. Our approach focuses on the conformal modes to respect local Lorentz symmetry. As for the curvature perturbation, it is shown to be consistent with our result through  $\Upsilon\delta N$  formalism. We obtain the dynamical  $\Upsilon$ beta function of  $g = 1/S$  under the Gaussian approximation. The dimensionless gravitational coupling  $g$  is asymptotically free toward the future. It also possesses the ultraviolet fixed point indicating that the Universe began with the de Sitter expansion near the Planck scale with  $\Upsilon\epsilon = 0$ . We claim inflationary Universes subsequently dominate as the solutions of stochastic equations to maximize the entropy. This is a strong evidence for non-perturbative de Sitter duality between the classical slow roll inflaton and quantum stochastic effects around the Horizon.

**Primary author:** KITAZAWA, Yoshihisa (KEK Theory Center)

**Presenter:** KITAZAWA, Yoshihisa (KEK Theory Center)

**Session Classification:** Break and Poster Session