

# Holographic $\beta$ function in de Sitter space

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Renormalization group and FP equation.

$$\langle \omega^2 \rangle_{\text{bulk}} = -\frac{3g}{4} \int_{Ha(t)}^{\Lambda} \frac{dk}{k} = \frac{3g}{4} Ht = \frac{3g}{4} N(t).$$

Conformal zero mode distribution:  
boundary

$$\rho = \sqrt{\frac{4\xi(t)}{\pi g(t)}} \exp\left(-\frac{4\xi(t)}{g(t)} \omega^2\right).$$

Renormalization group leads to FP equation

$$\frac{\partial}{\partial t} \rho - \frac{3g(t)}{4} \cdot \frac{H}{2} \frac{\partial^2}{\partial \omega^2} \rho = 0.$$

Master equation

$$\frac{\partial}{\partial N} \log \frac{g(t)}{\xi} = 6\xi.$$

**A UV complete solution**

$$g_f = \frac{2}{\log N} \left(1 - \frac{1}{\log N}\right), \quad \xi_f = \frac{1}{6N} \left(1 - \frac{1}{\log N}\right).$$

**B Inflationary solution**

$$g = c\tilde{N}^{\frac{m}{2}}, \quad \xi = \frac{m+2}{12\tilde{N}}. \quad V \sim f^m$$

$\sqrt{AB}$  **composite Universe**  $m=1$

