

Constraining Reheating Temperature by ACT DR6

Based on the work of Zi-Han Li & Shi Pi (2511.xxxxx)

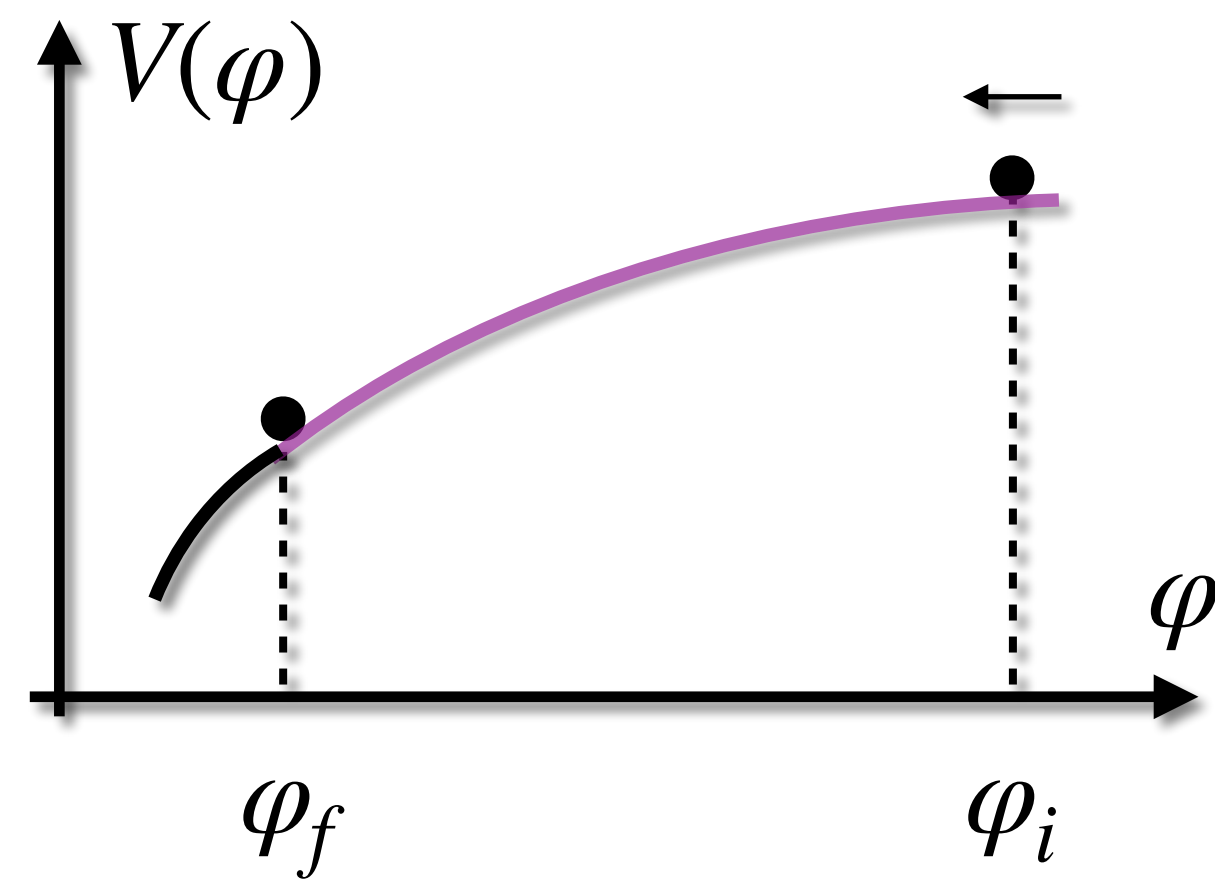
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2025.11.01 @ HIAS-UCAS

The inflationary universe

physical scale

potential of inflaton



the maximal observable physical scale

$$H \propto \sqrt{\rho} \propto a^{-2}$$

$$s \propto a^{-3}$$

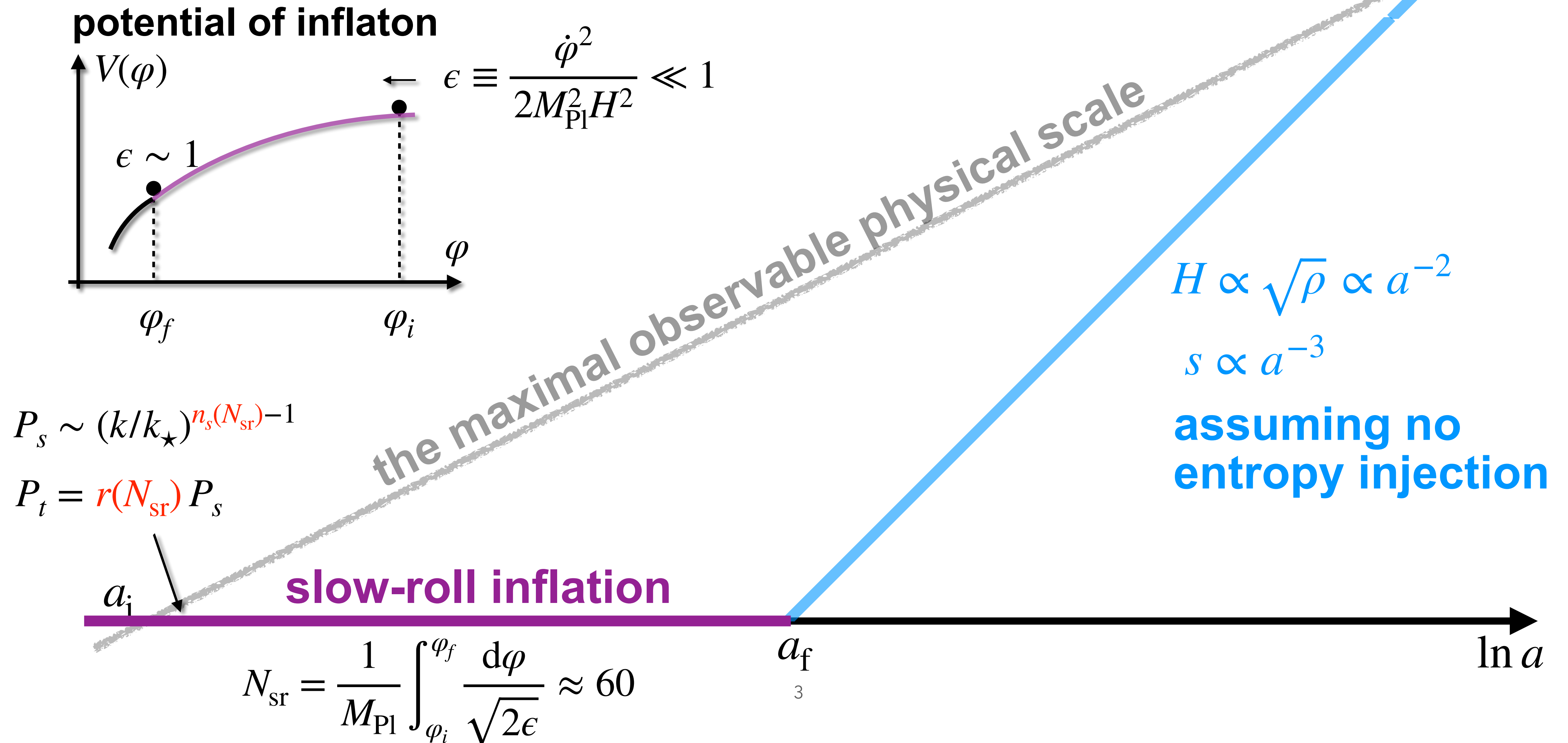
assuming no
entropy injection

a_i **slow-roll inflation**

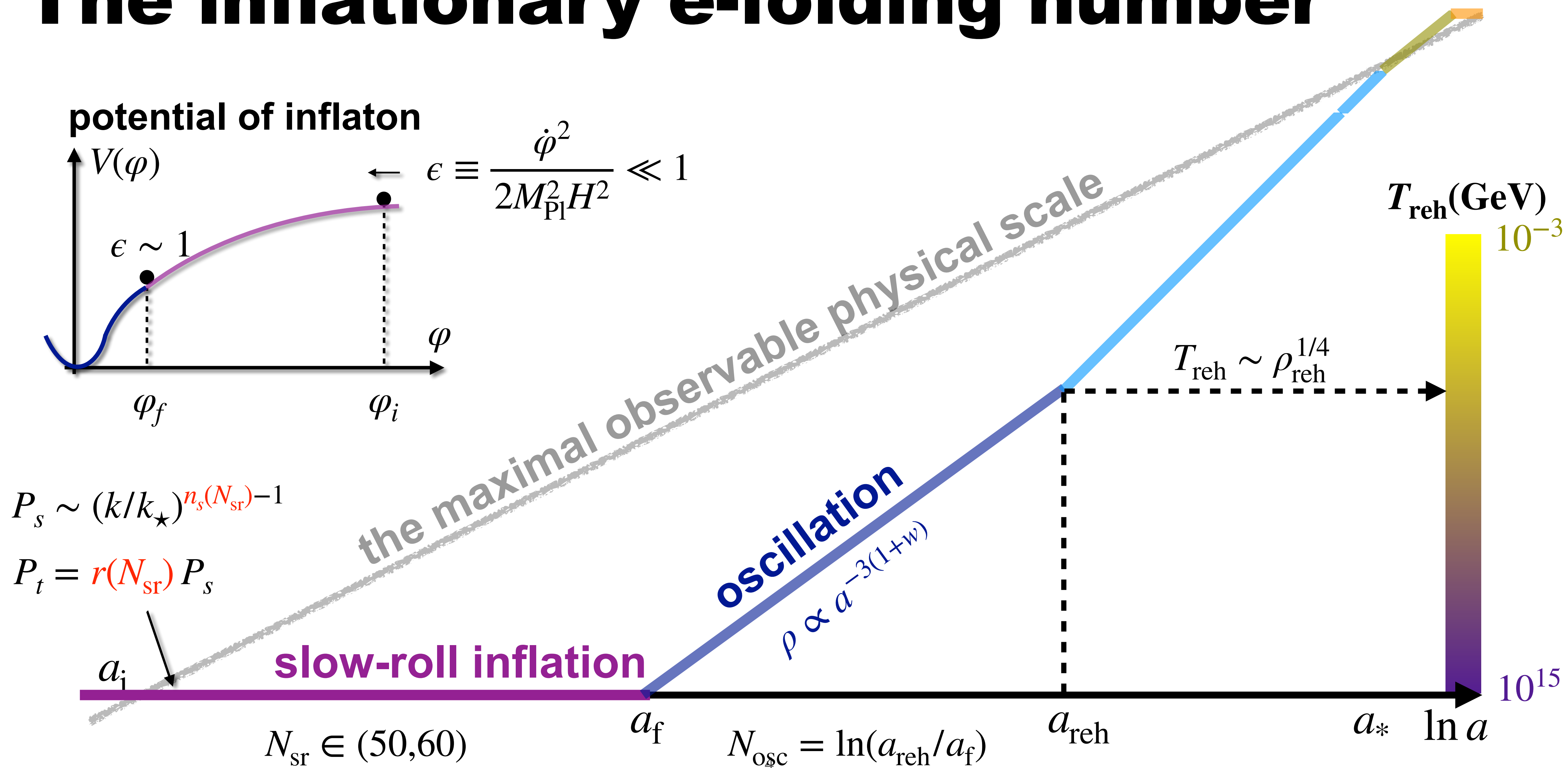
a_f

$\ln a$

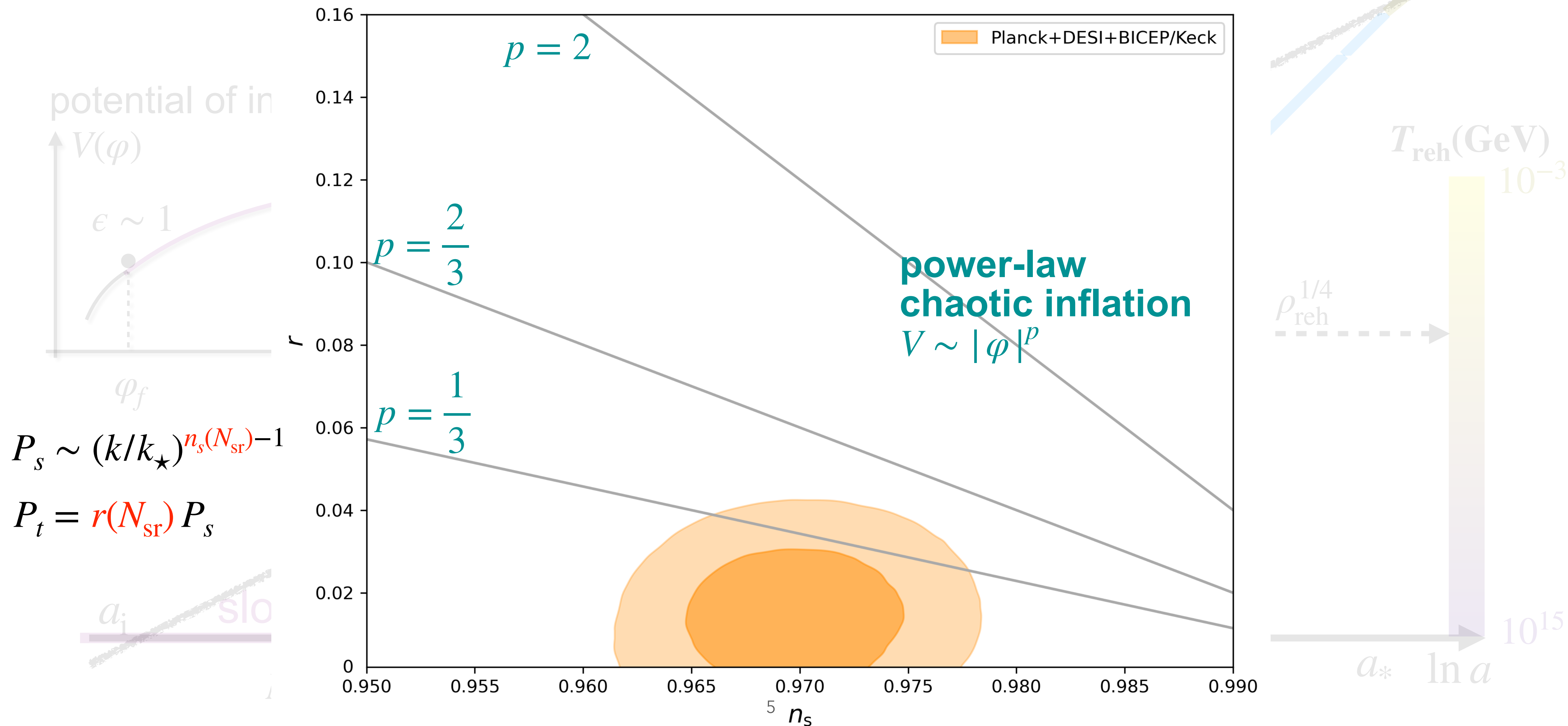
The inflationary e-folding number



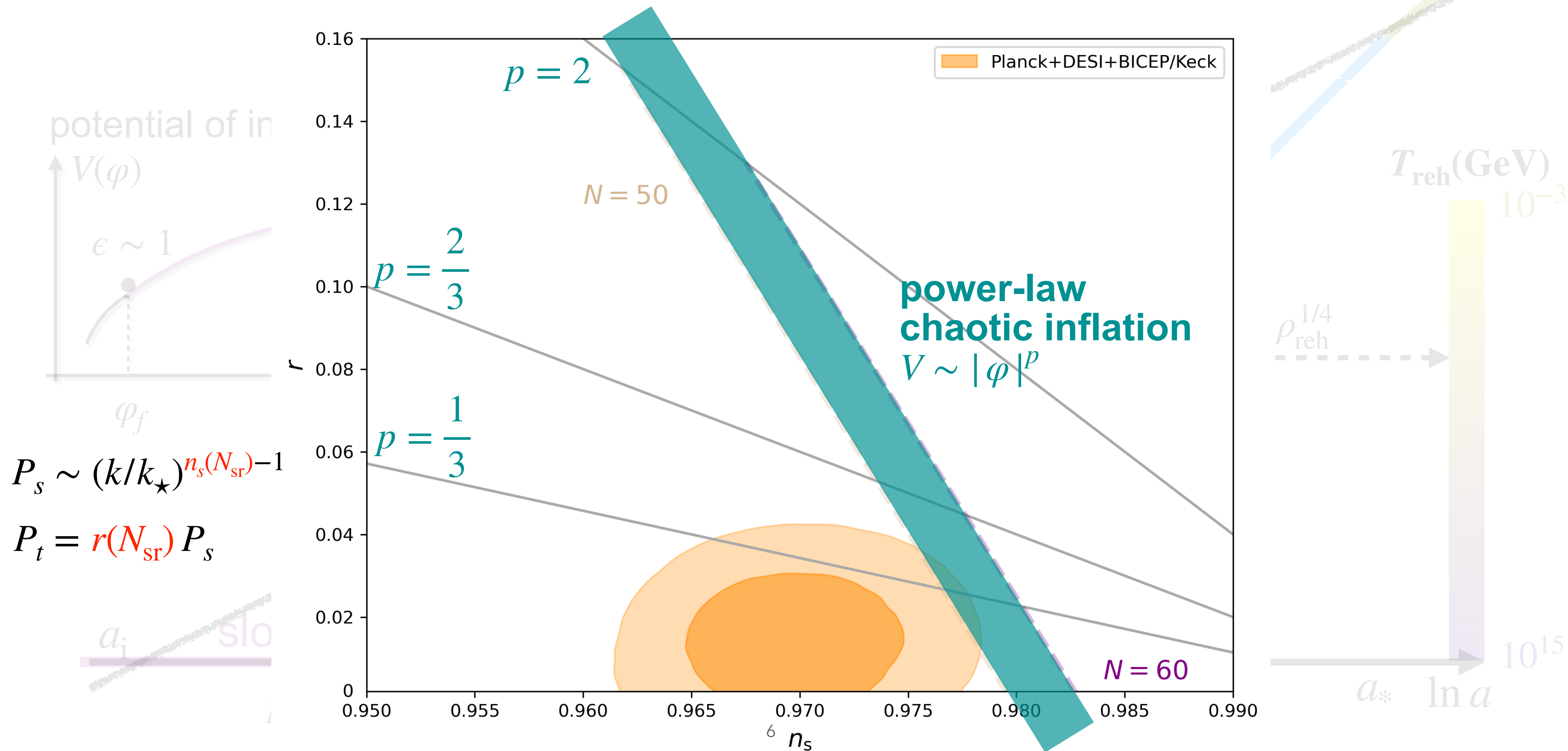
The inflationary e-folding number



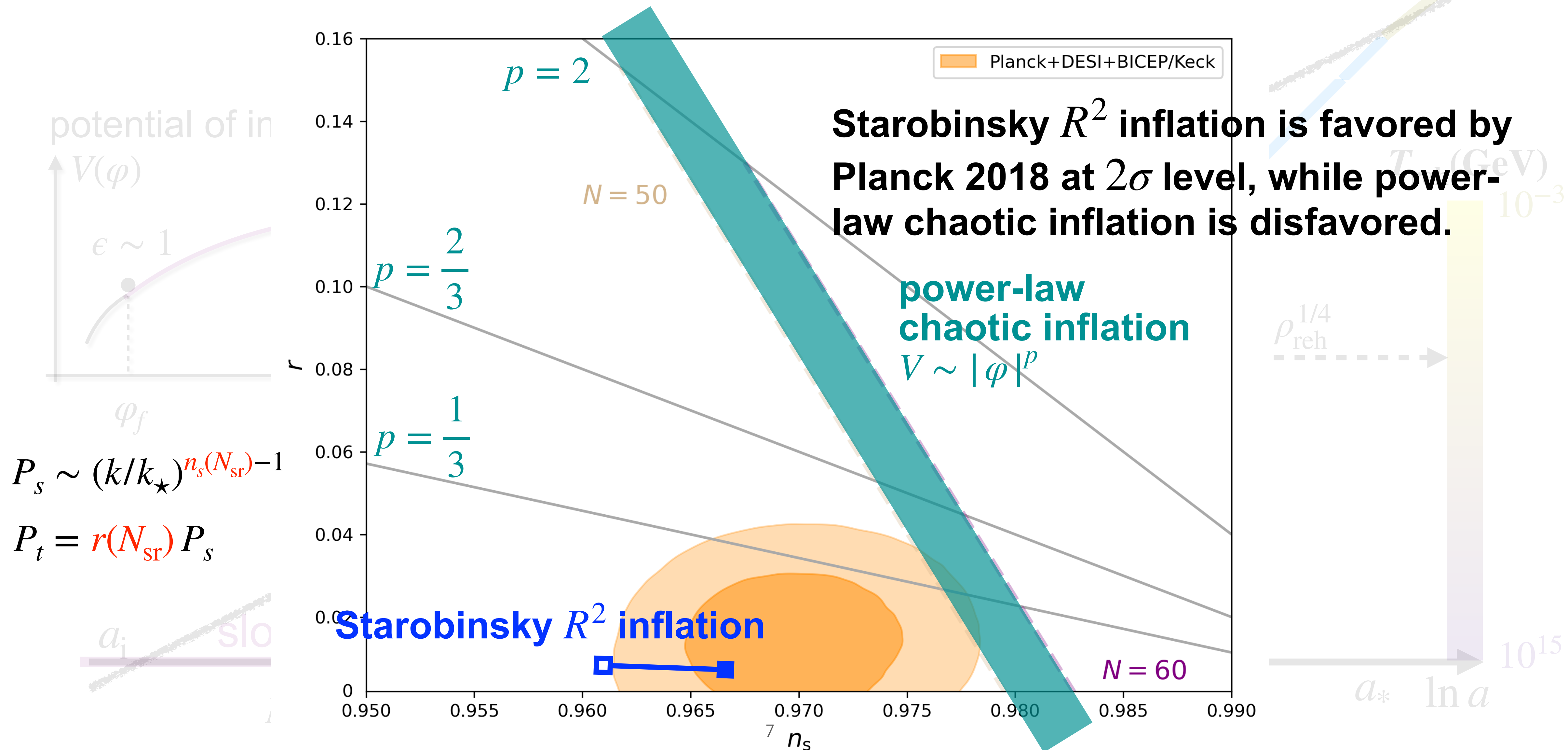
CMB Observations



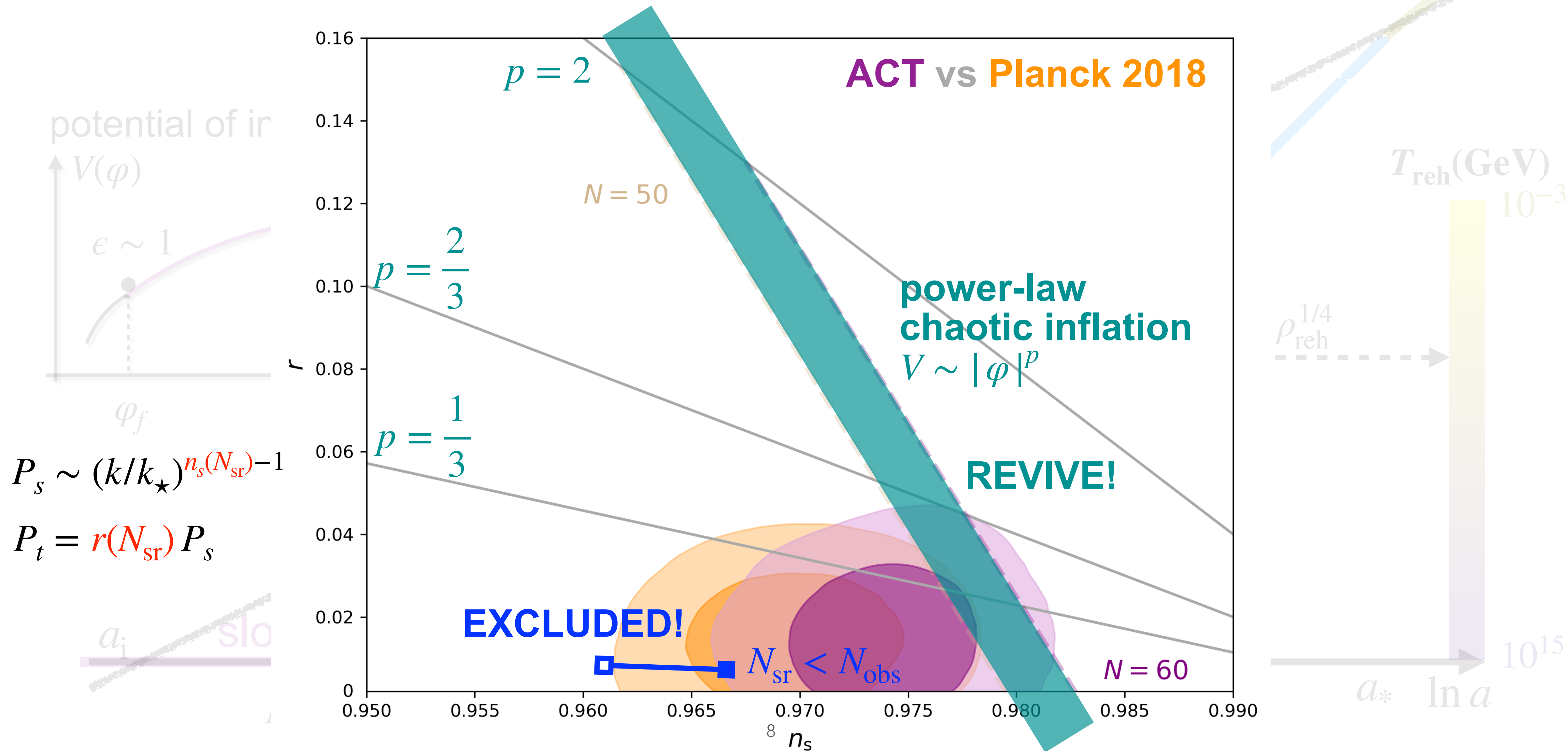
CMB Observations



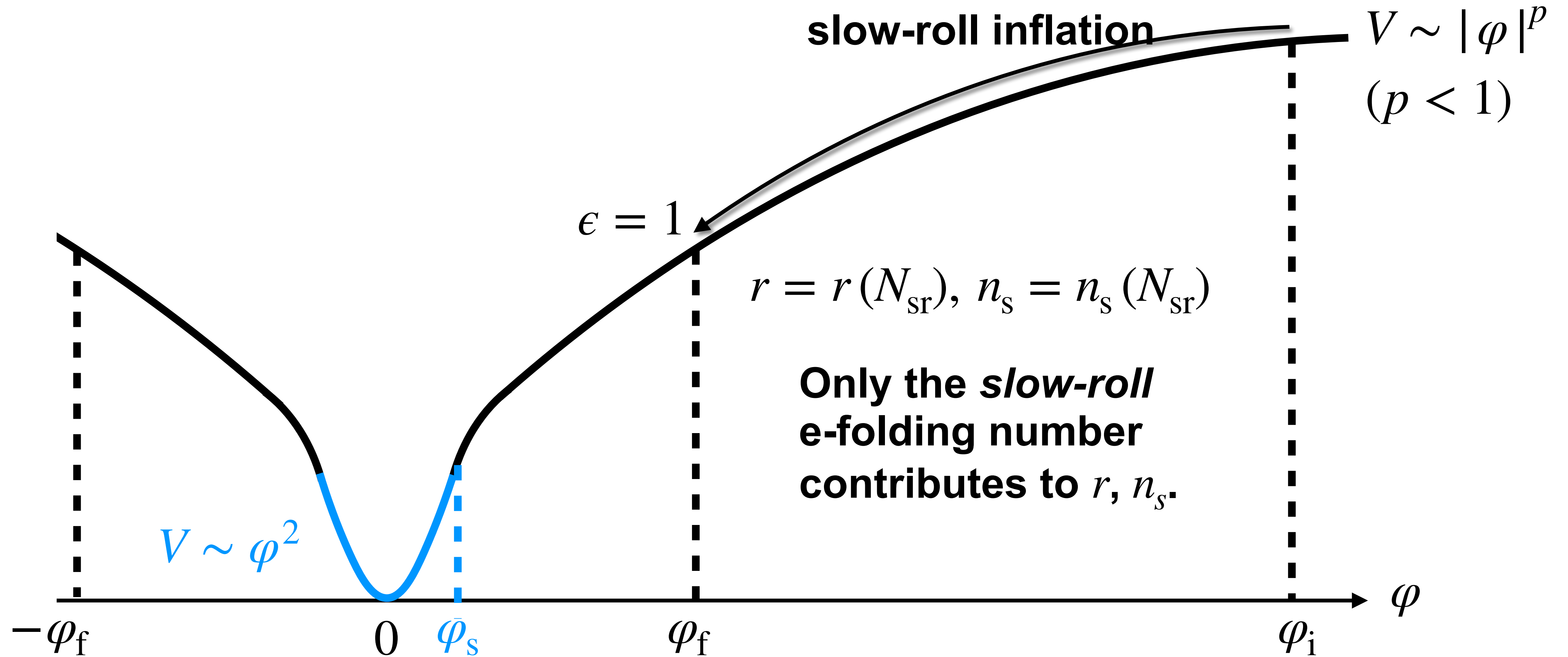
CMB Observations



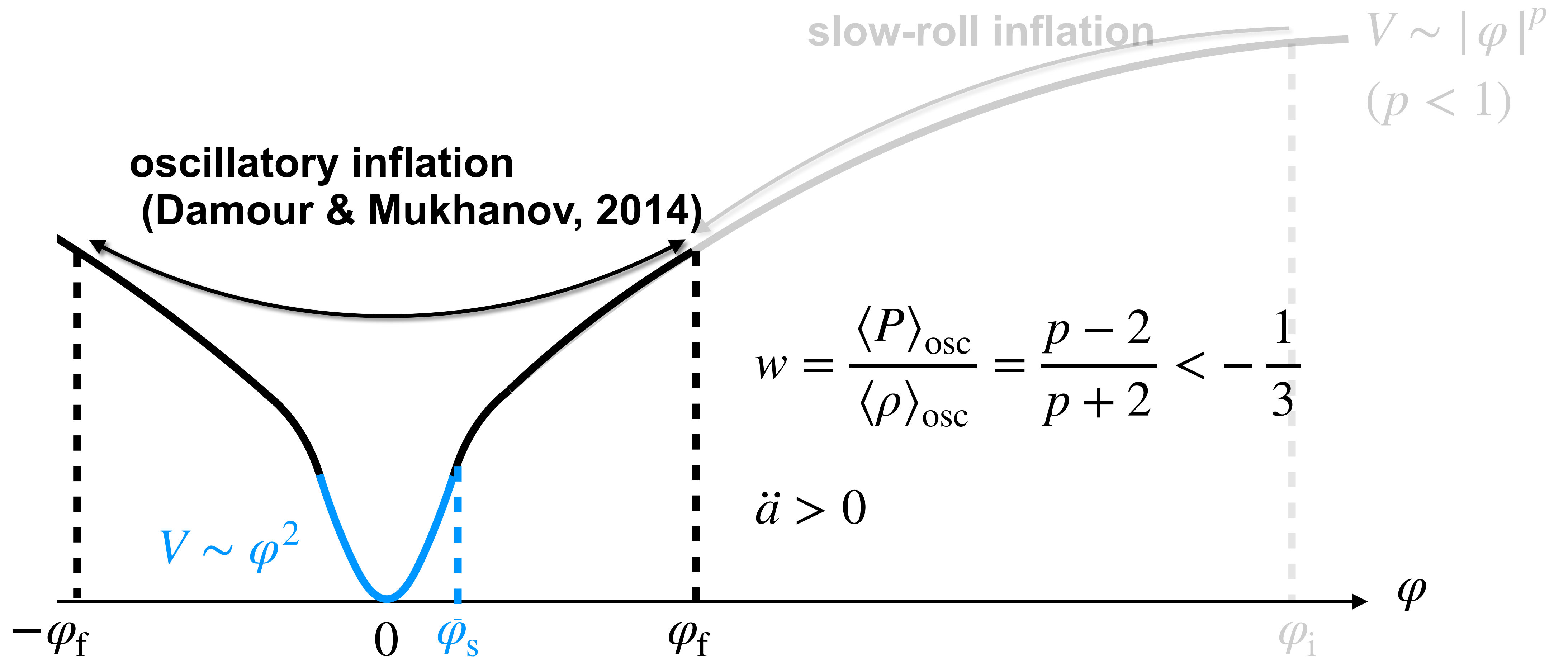
Tension from ACT



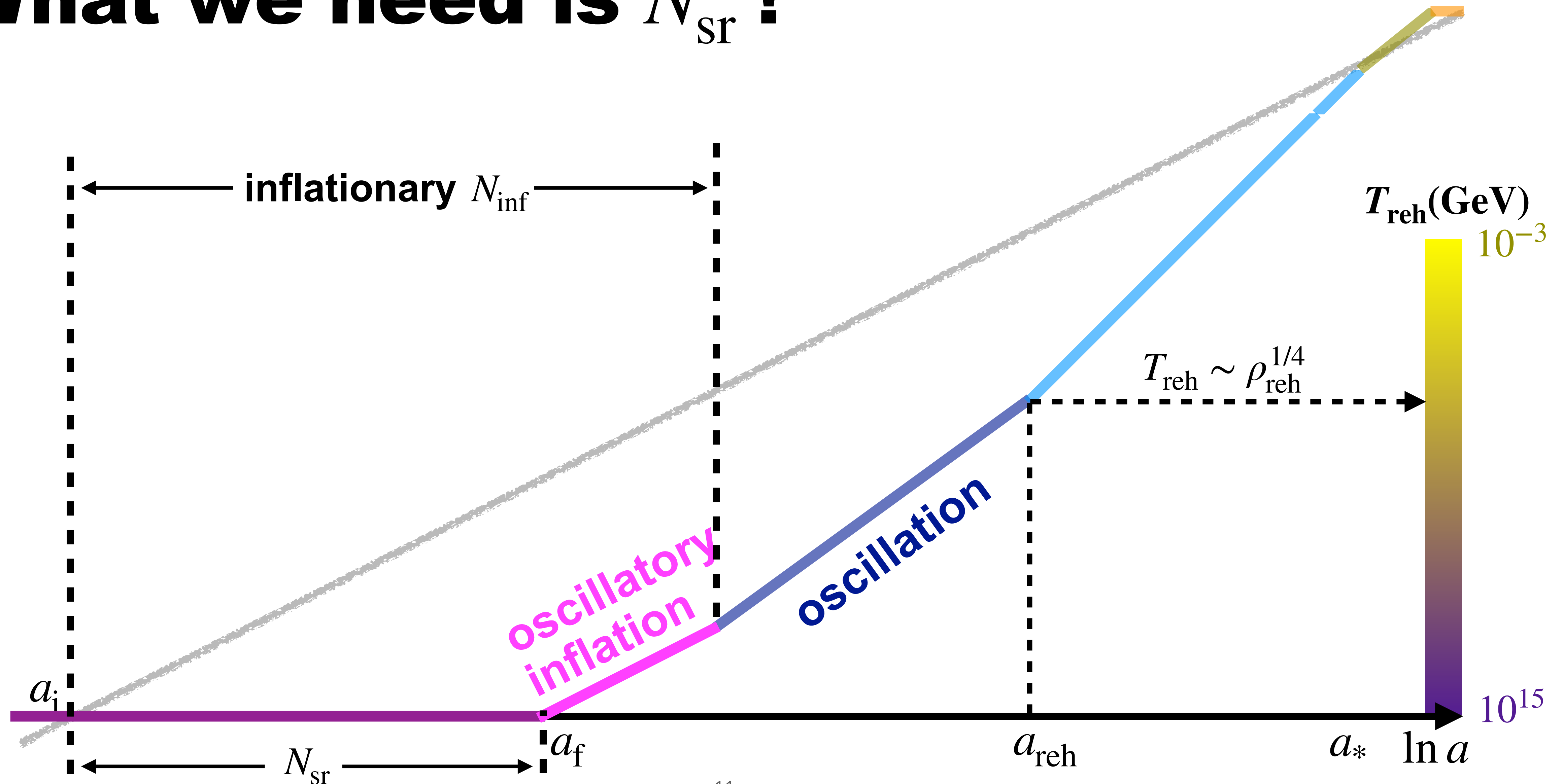
Power-law chaotic inflation



Oscillatory inflation



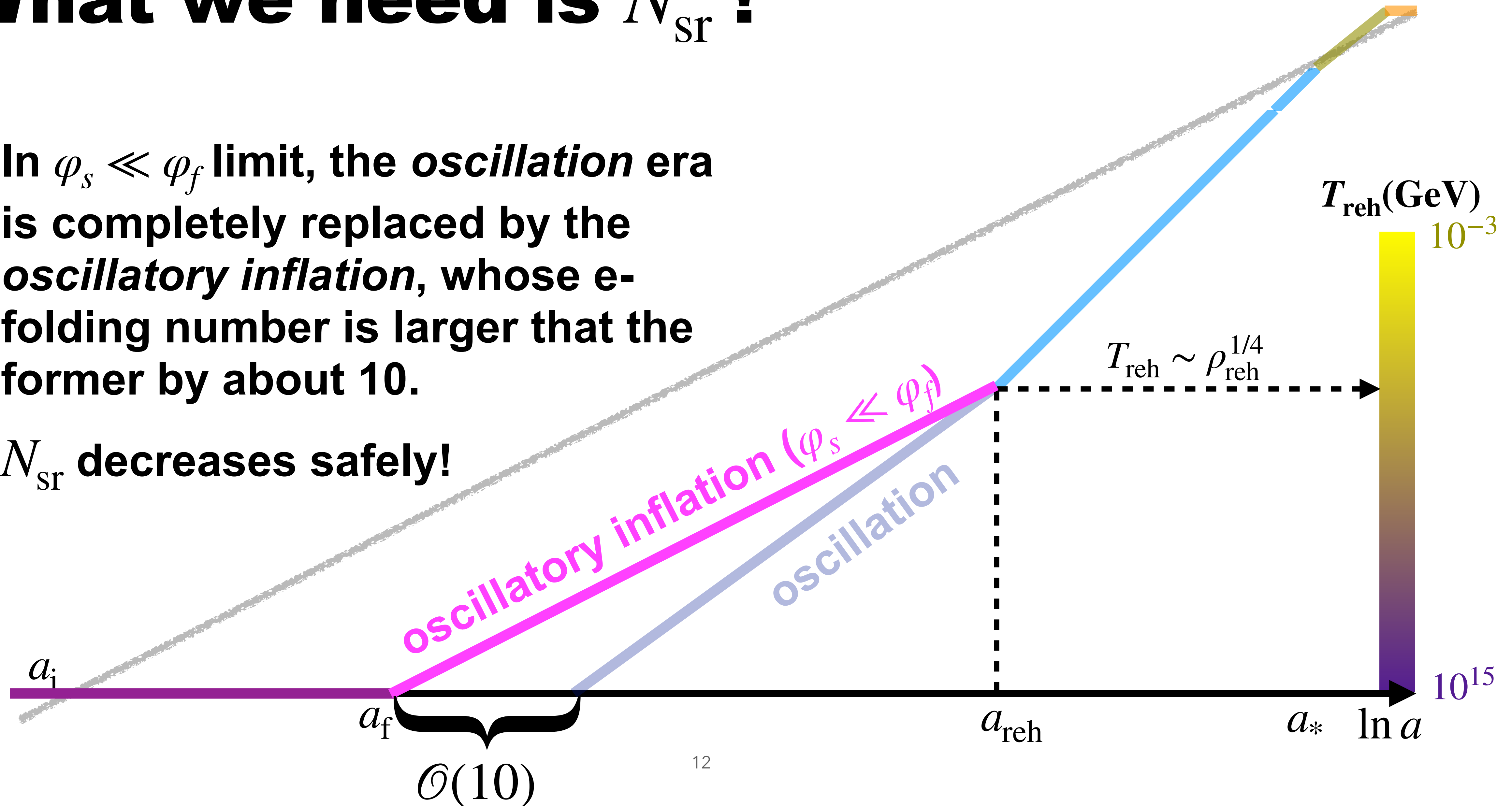
What we need is N_{sr} !



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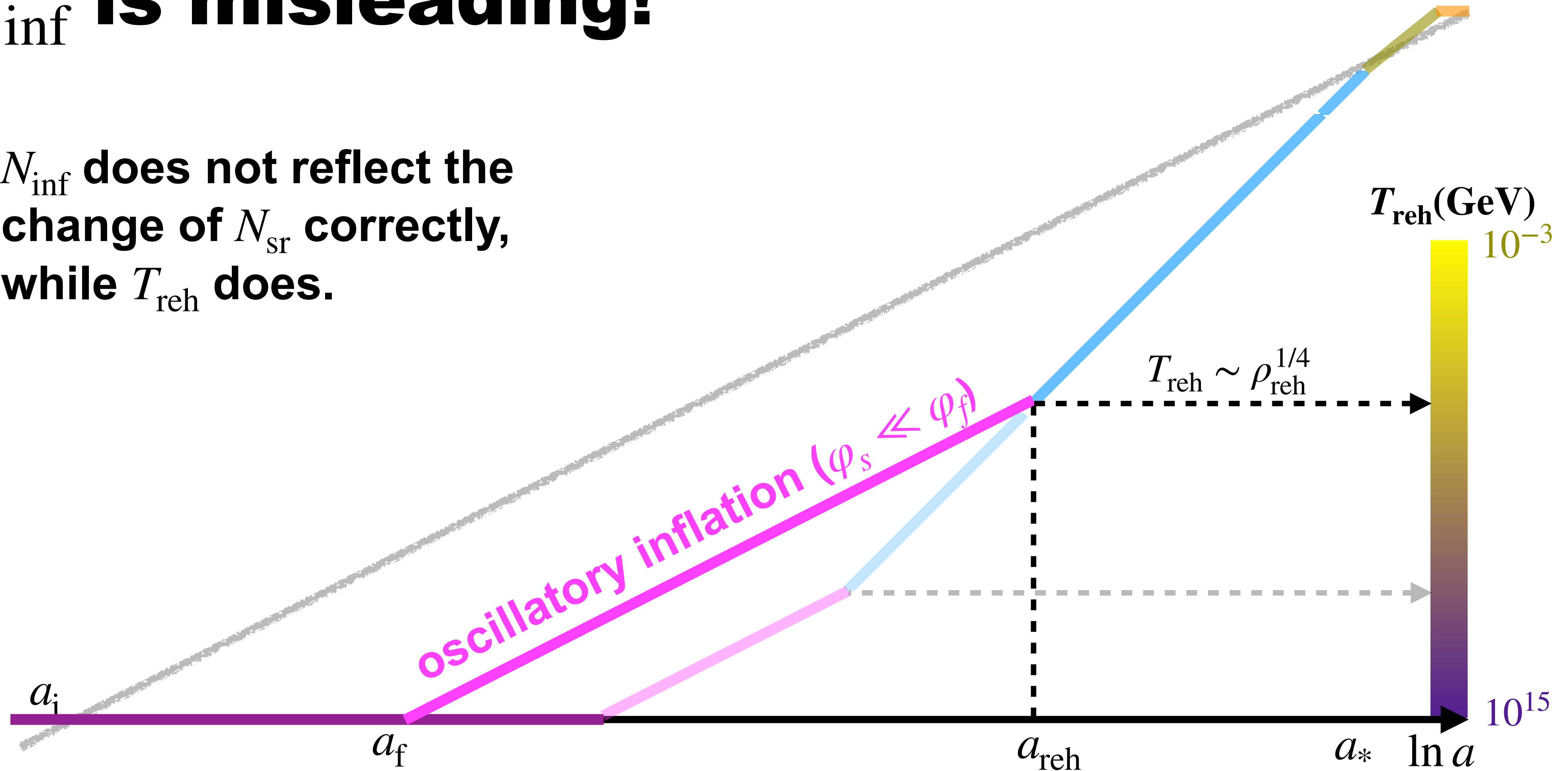
In $\varphi_s \ll \varphi_f$ limit, the *oscillation era* is completely replaced by the *oscillatory inflation*, whose e-folding number is larger than the former by about 10.

N_{sr} decreases safely!

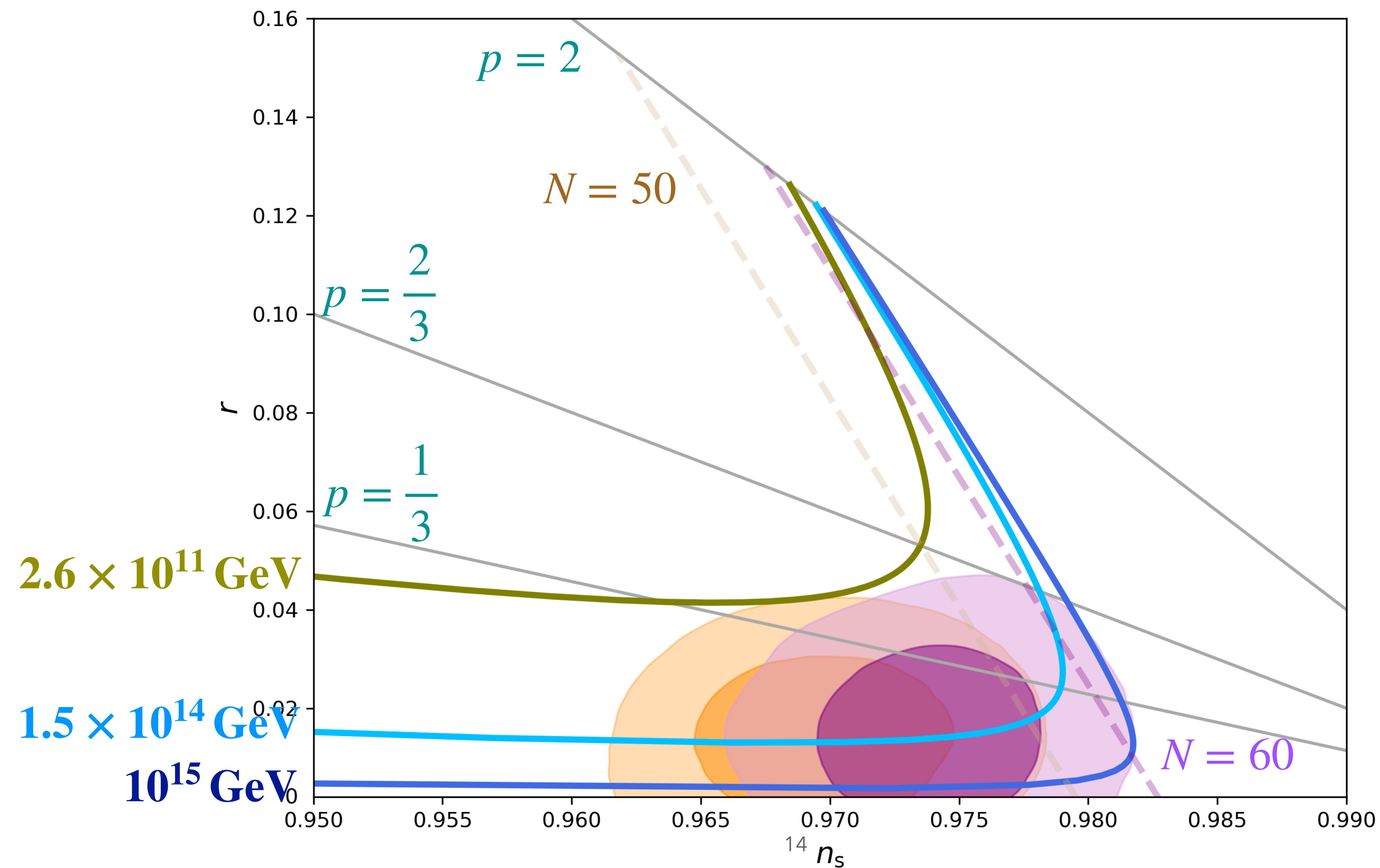


N_{inf} is misleading!

N_{inf} does not reflect the change of N_{sr} correctly, while T_{reh} does.



Numerical results



Conclusions

- ACT has increased the observed scalar spectral index and slow-roll e-folding number, which favors the power-law chaotic inflation model.
- An intermediate oscillatory inflation stage reduces the slow-roll e-folding number.
- The power-law chaotic inflation is consistent with both ACT and Planck 2018 as long as $p \lesssim \frac{2}{3}$ and $T_{\text{reh}} \gtrsim 10^{11}$ GeV.

THANK YOU!