Primordial Black Hole Dark Matter and Squeezed Non-Gaussianity

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Based on arXiv:1812.08243 with
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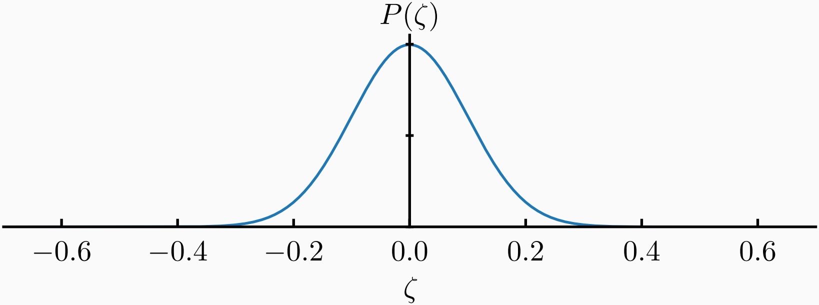
Non-Gaussianity and the PBH abundance



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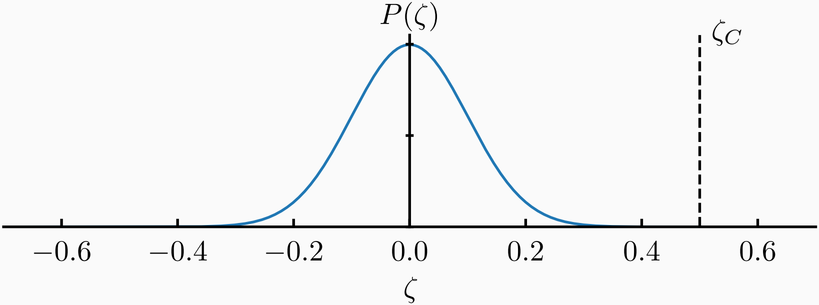

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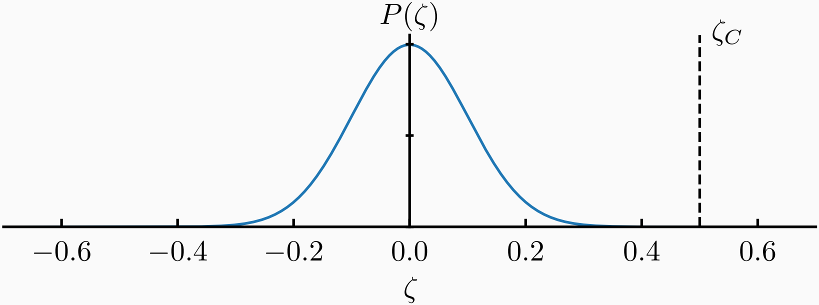

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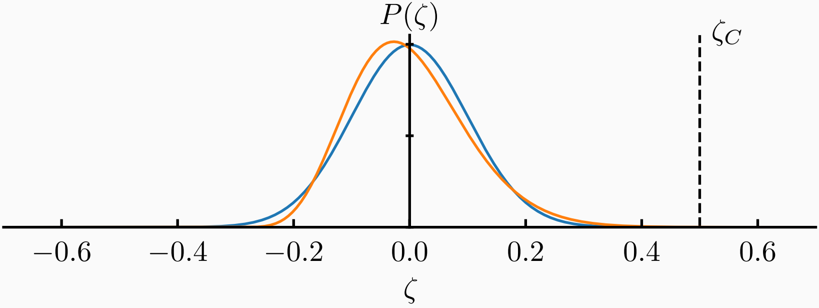

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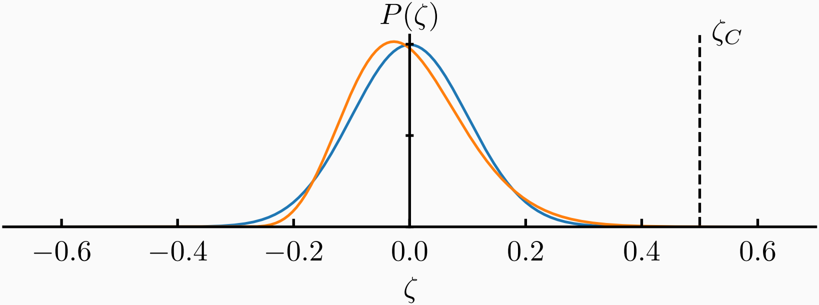

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- $P_{\rm NG}(\zeta > \zeta_C) \propto \exp\left[-\nu^2/2 + \sum_n (-1)^n \xi^{(n)}(0) \times \nu^n/n!\right]$

see Franciolini++18

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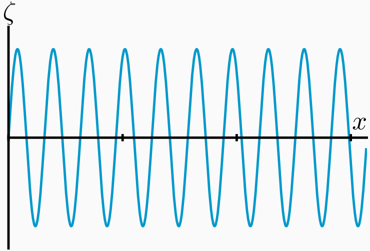

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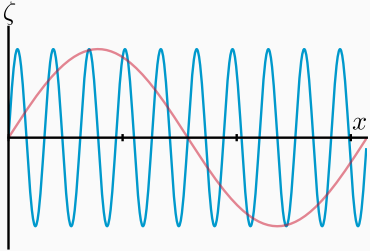

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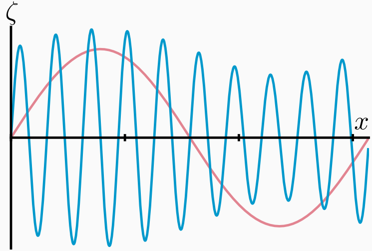

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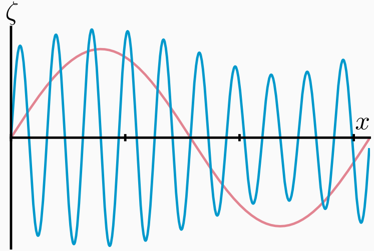

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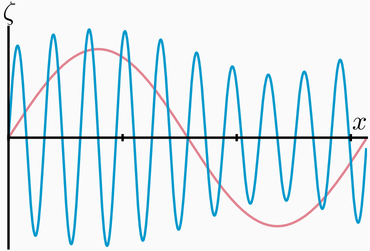

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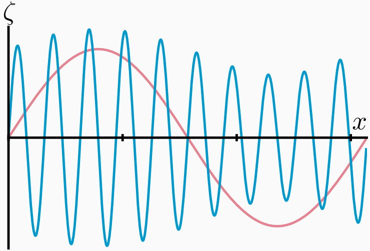

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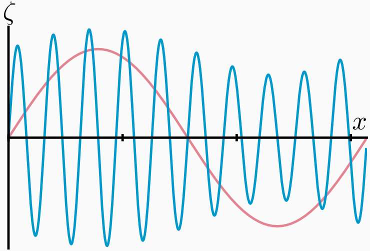

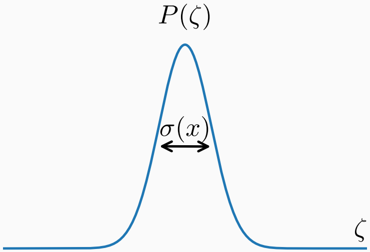

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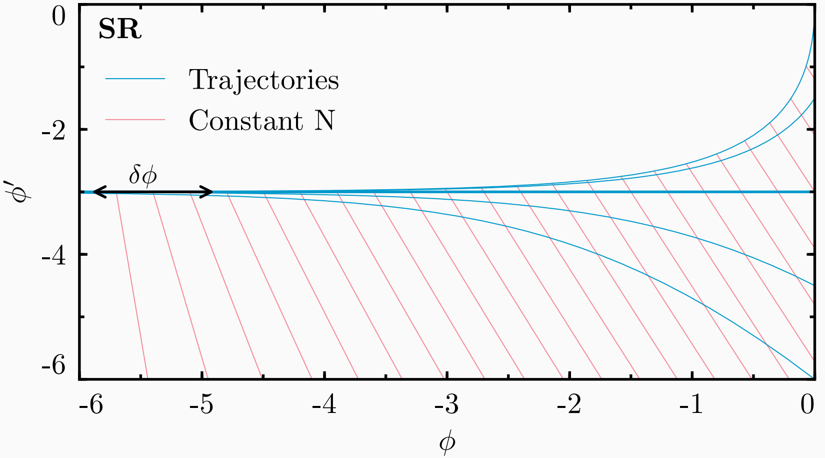
No Go 2.0

Long-short coupling has no effect on PBH statistics in SR

Visually: Squeezed NG vanishes locally after inflation



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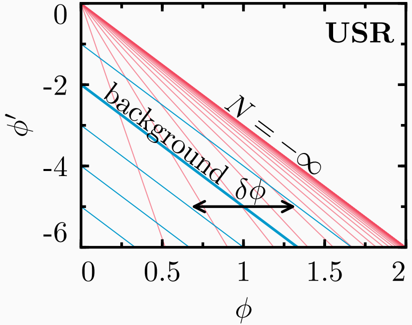

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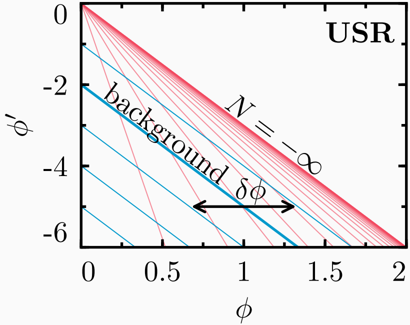

δN formalism

(Starobinsky85, Sasaki+Stewart96)

$$\frac{12}{5} f_{\rm NL} = 2 \frac{\partial^2 N}{\partial \phi^2} \Bigg/ \left(\frac{\partial N}{\partial \phi} \right)^2$$

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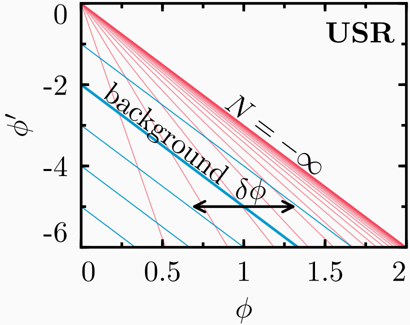

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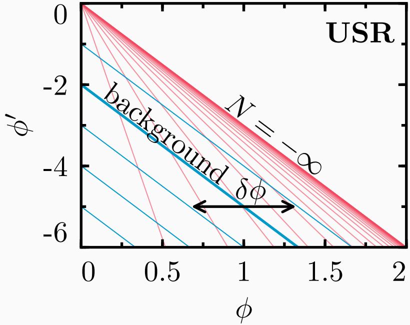

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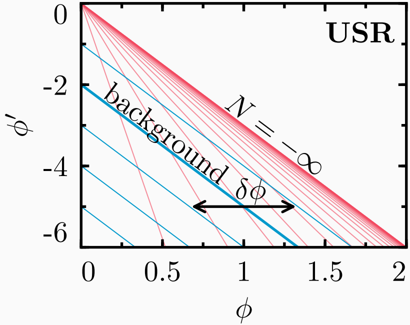

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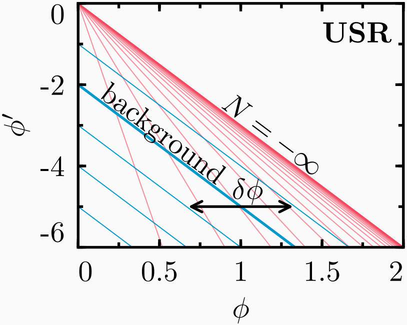

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If not enough PBHs are produced in Gaussian approximation, then squeezed NG does not change conclusions

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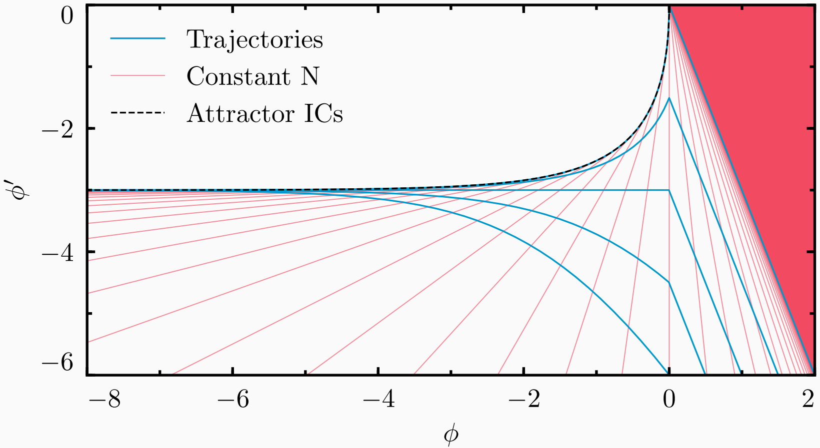
- Cai++17: For **instant potential transitions** from flat (USR) to tilted (SR), USR result holds only for **large** transitions

$$h \equiv \sqrt{\frac{\epsilon_V(\phi^-)}{\epsilon_H(\phi^+)}} \gg 1$$

Visually: Only Top Trajectories have large f_{NL}



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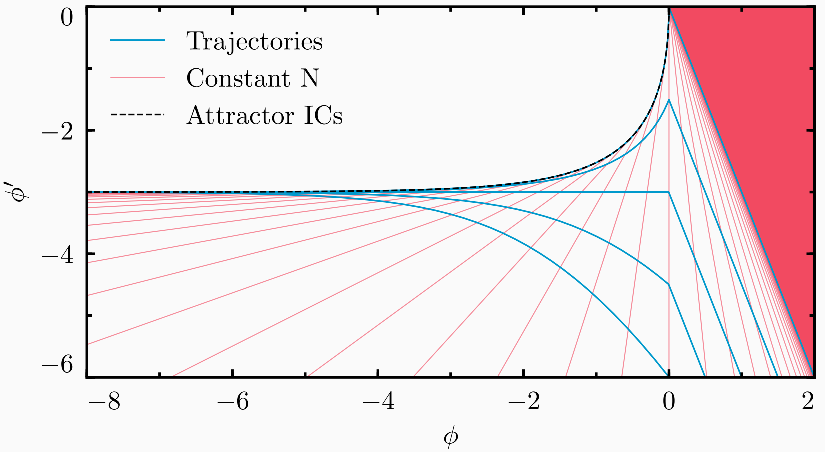
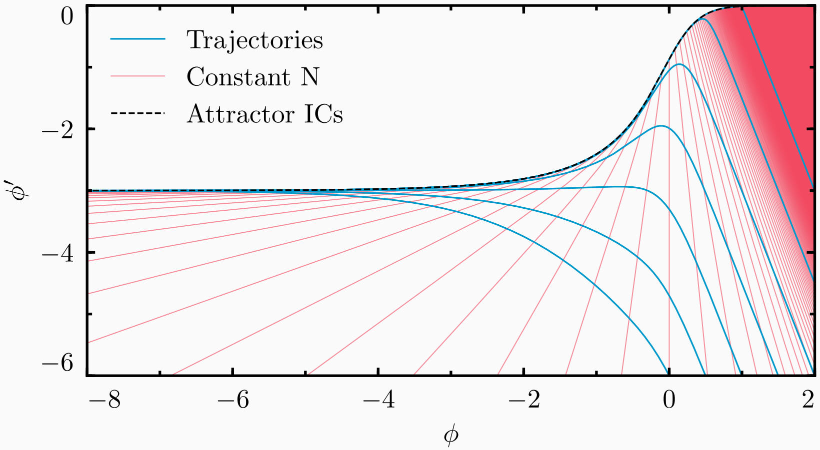


(results actually computed with in-in and δN)

Finite Width Transitions, Large f_{NL} trajectories suppressed



So transitions must be **large** and **fast**

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