

No Warm Inflation From a Vanilla Axion

Sebastian Zell

UCLouvain

Based on [arXiv:2408.07746](https://arxiv.org/abs/2408.07746).

10th September 2024

The first moments of our Universe

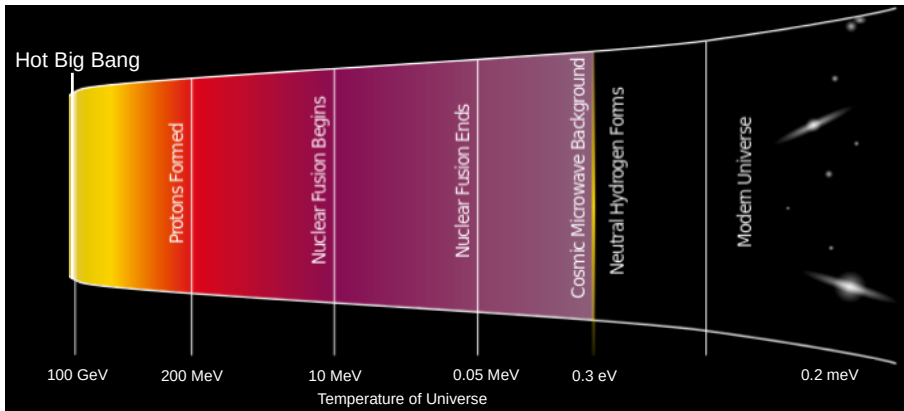


Image credit: National Science Foundation (NASA, JPL, Keck Foundation, Moore Foundation, BICEP2 Program)

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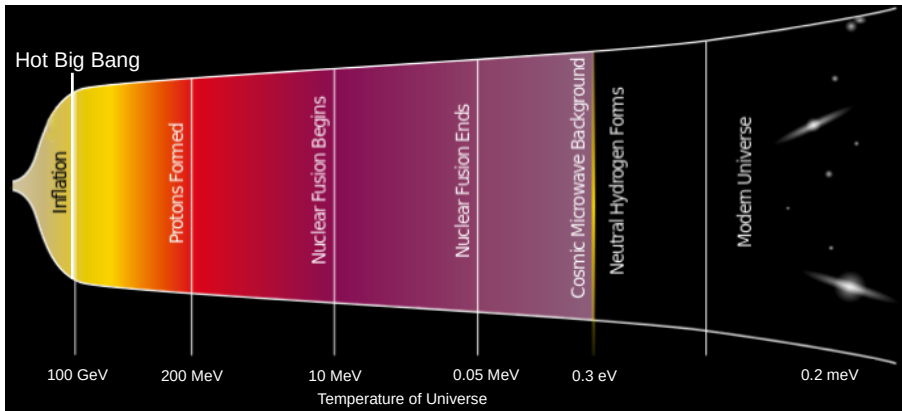


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Cold vs. warm inflation

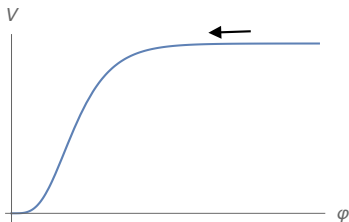


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Inflation
↙
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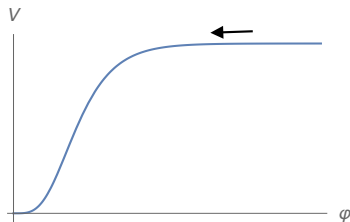
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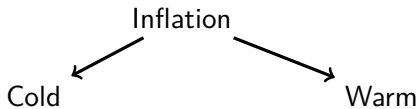
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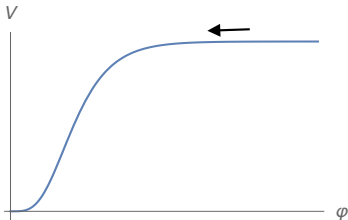


Problem: quantum corrections

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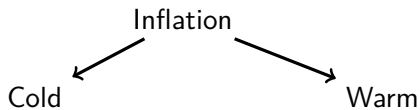


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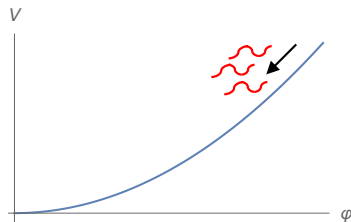
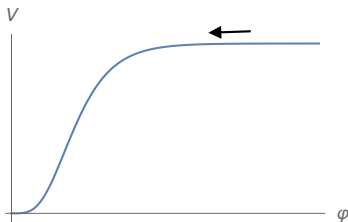


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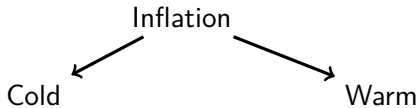


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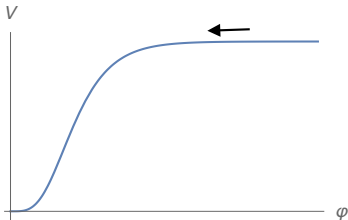


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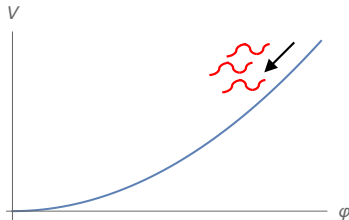
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Problem: thermal corrections

Solution: sphaleron heating

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- ▶ Natural identification of φ as axion?

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Outline

No warm inflation from a vanilla axion

- 1 Motivation
- 2 The argument
- 3 Conclusion

A vanilla axion³

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- ▶ No assumption about vanilla gauge group

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$$\iff V' > \left(\frac{8\pi^6 g_*^3 f^8 V^5}{375 \tilde{c}_{\text{sph}}^4 M_P^{10}} \right)^{1/6}$$

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- ▶ Ways out:⁵ no shift symmetry, $\tilde{c}_{\text{sph}} \gg 1, \dots$

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- ▶ Ways out: no (vanilla) axion, dark energy, . . .