

Damping of an oscillating scalar field indirectly coupled to a thermal bath

Erwin H. Tanin (IBS-CAPP)

Based on Erwin H. Tanin and Ewan D. Stewart (in preparation)

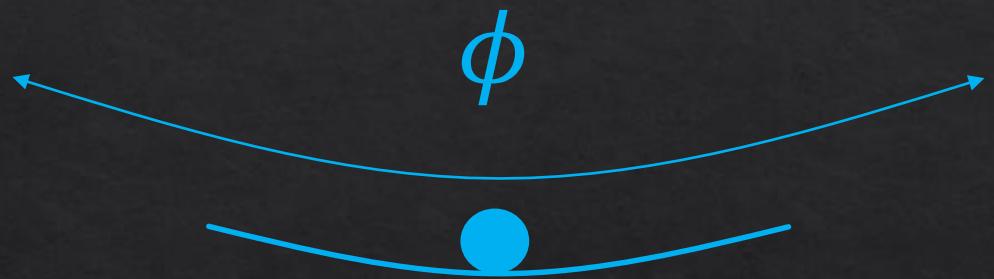
SUSY



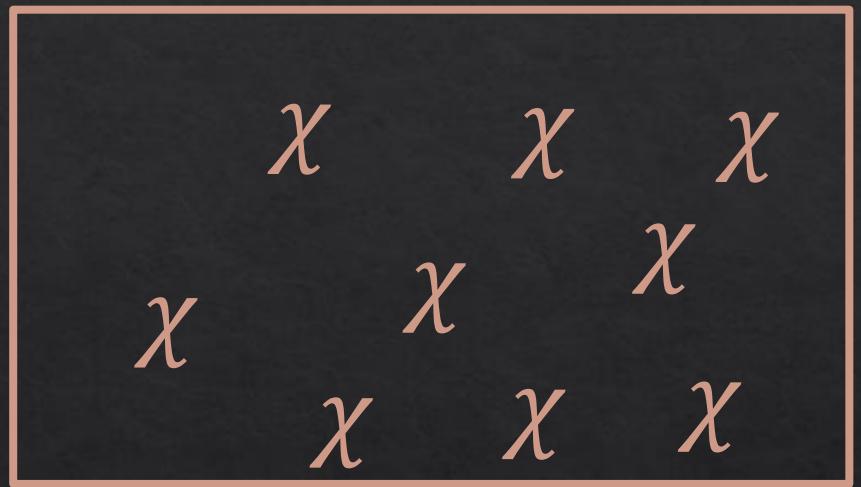
flat
directions

hierarchy problem
gauge coupling unification
potential dark matter candidates
higgs mass prediction

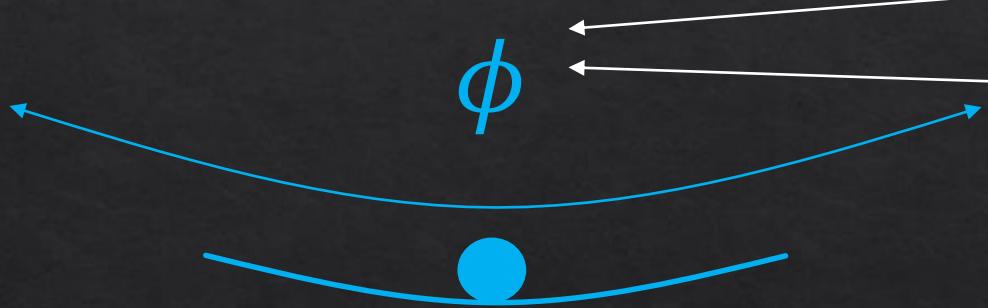
moduli problem
Affleck-Dine baryogenesis
thermal inflation
non-topological solitons



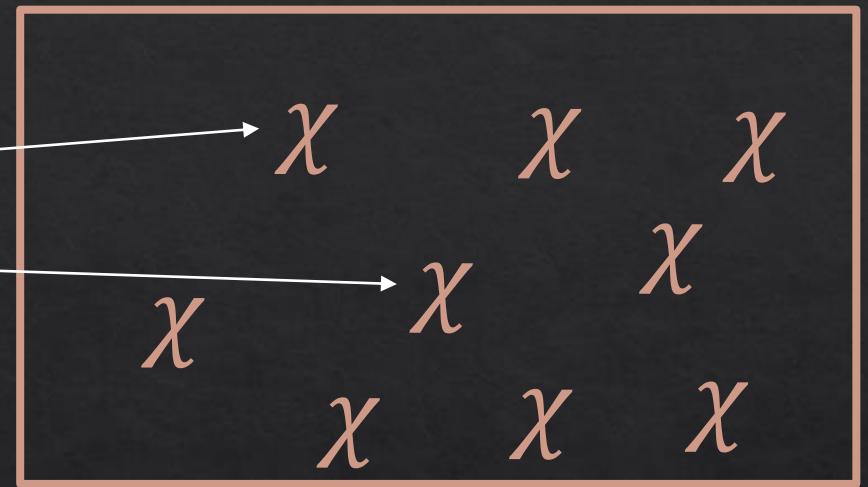
flat direction



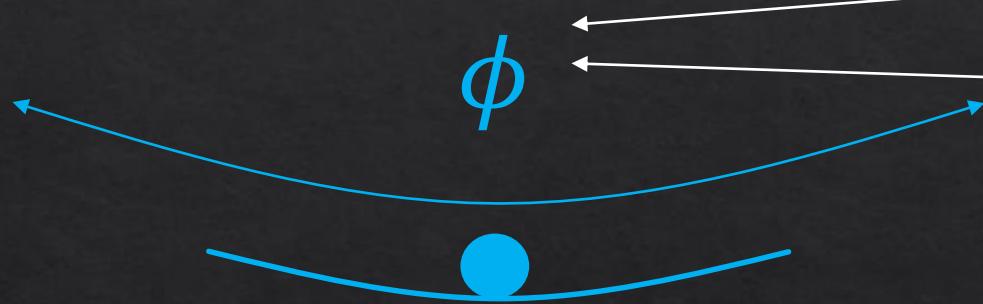
thermal bath



ϕ

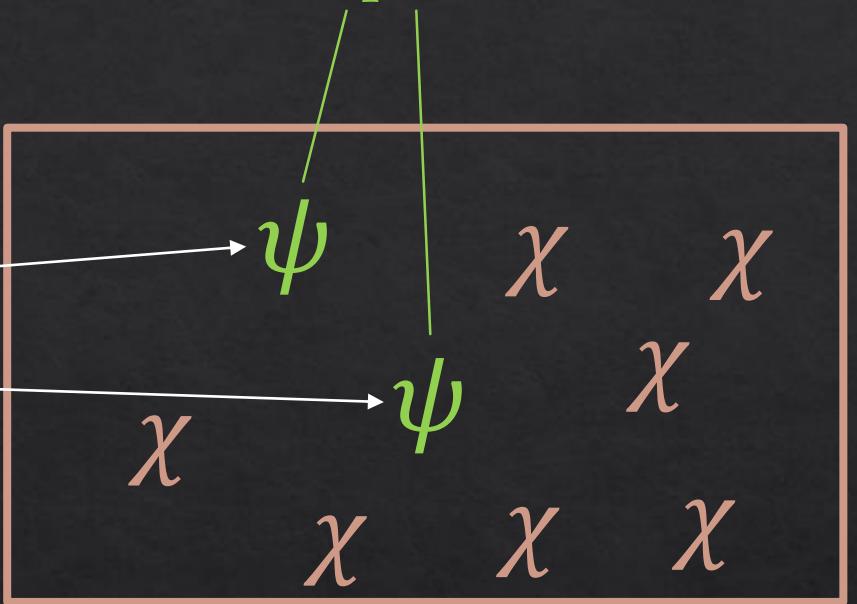


thermal bath



flat direction

out of equilibrium



thermal bath

$$\phi \longleftrightarrow \psi \longleftrightarrow \chi$$

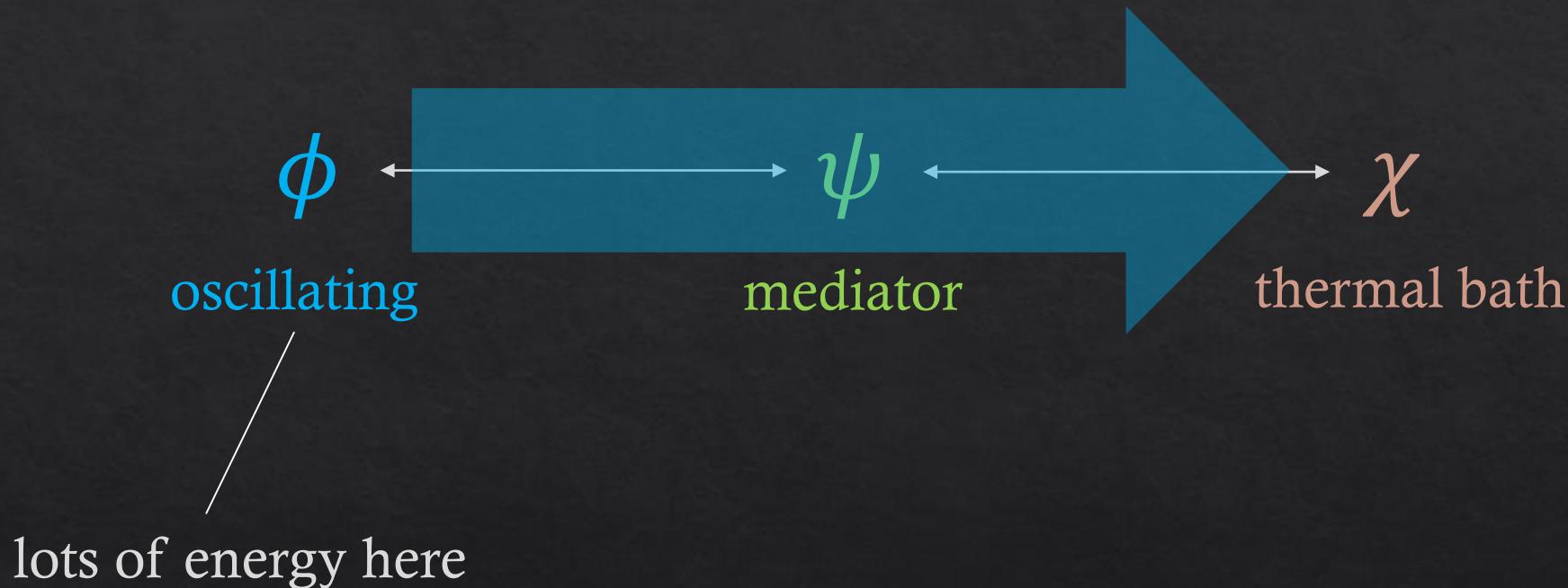
oscillating

mediator

thermal bath

lots of energy here

“mediated damping”



Mediated Damping

$$\xrightarrow{-A} \phi \xrightarrow{+A}$$

$$m_{\psi, \text{eff}}^2(t) = m_\psi^2 + m_{\psi, \text{th}}^2 + \lambda^2 \phi^2$$



Mediated Damping



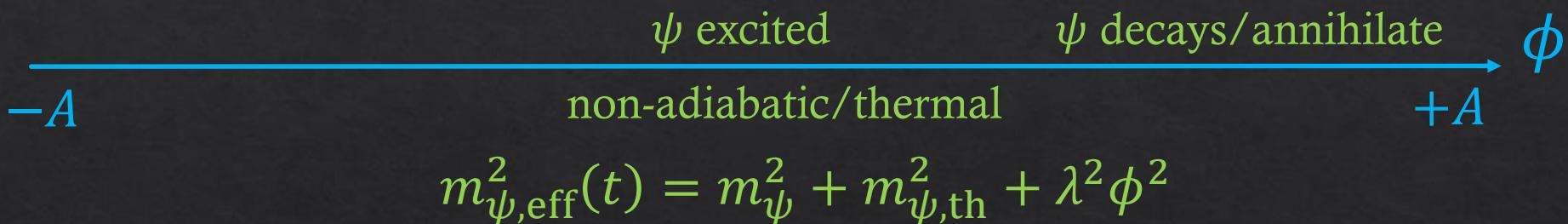
$$m_{\psi,\text{eff}}^2(t) = m_\psi^2 + m_{\psi,\text{th}}^2 + \lambda^2 \phi^2$$



Mediated Damping



Mediated Damping



Energy taken from ϕ and then dumped to χ



Thank You