EFT for supercooled phase transitions

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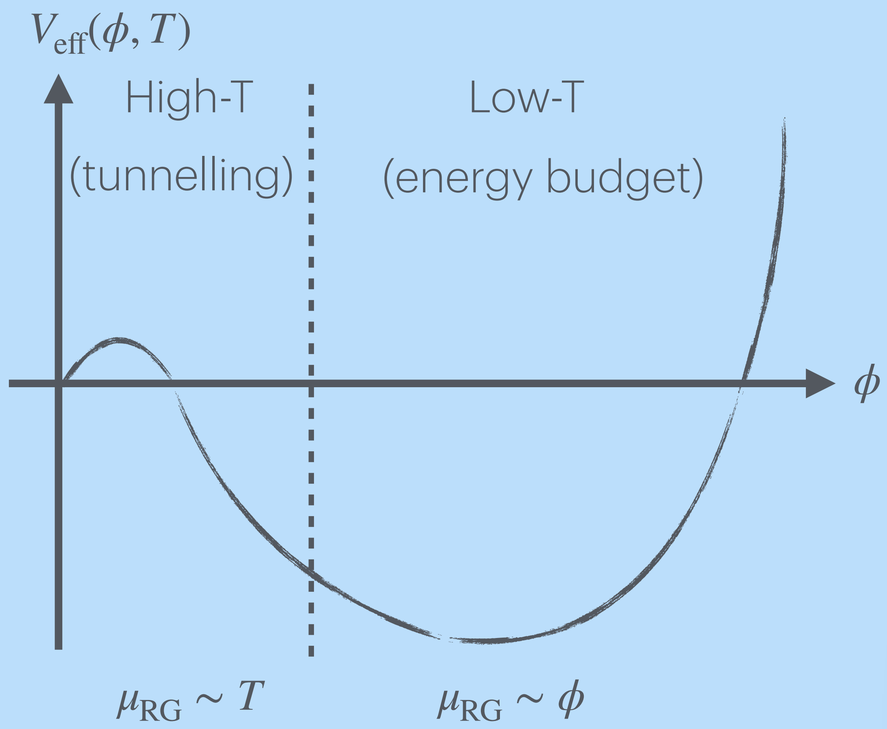
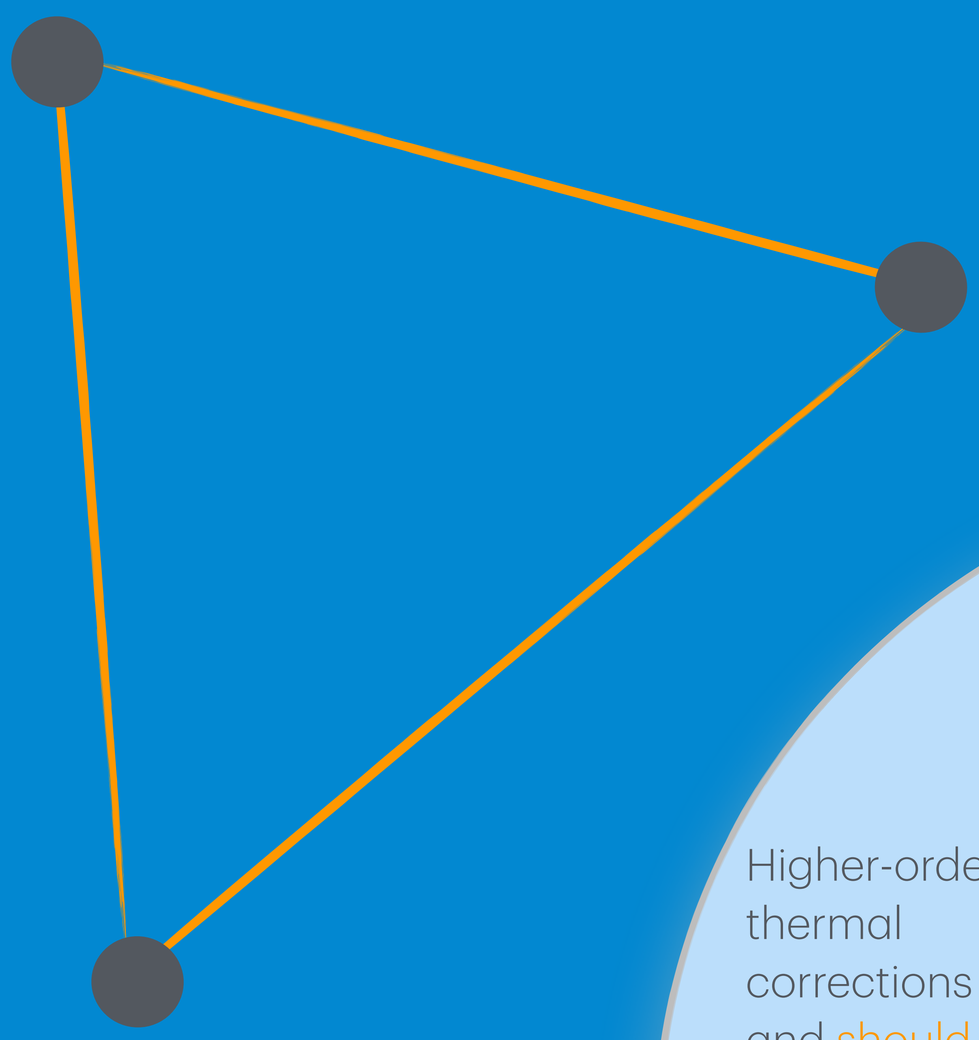
Supercooled PT in a classically scale-invariant model

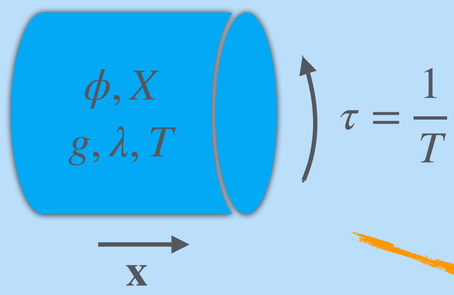


concrete model: SU(2)cSM

$$V_0(\phi) = \frac{1}{4}\lambda_1 h^4 + \frac{1}{4}\lambda_2 \phi^2 h^2 + \frac{1}{4}\lambda_3 \phi^4$$



High-temperature dimensional reduction



Integrating out the UV modes

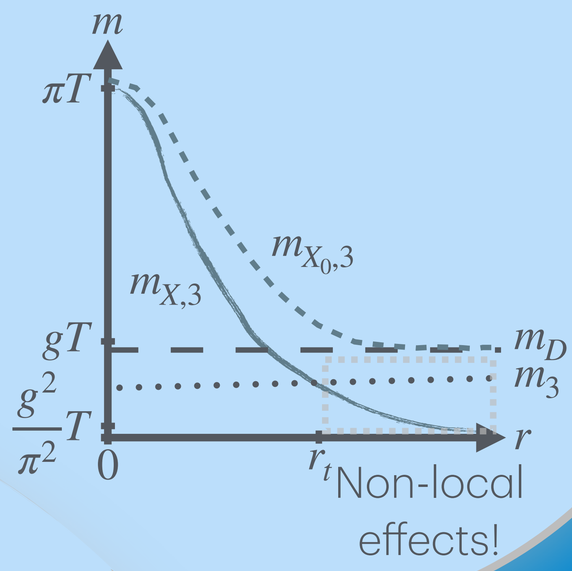
ϕ_3
$m_3(T), g_3(T), \lambda_3(T)$
x

Adding NLO corrections

$$S_3^{\rm EFT} = 4\pi \int {\rm d}r\, r^2 \left[\frac{1}{2}\left(1 + Z_3^{\rm NLO}(\phi_3)\right)(\partial_i \phi_3)^2 + V_3^{\rm LO+NLO}(\phi_3)\right]$$

Gives a large contribution

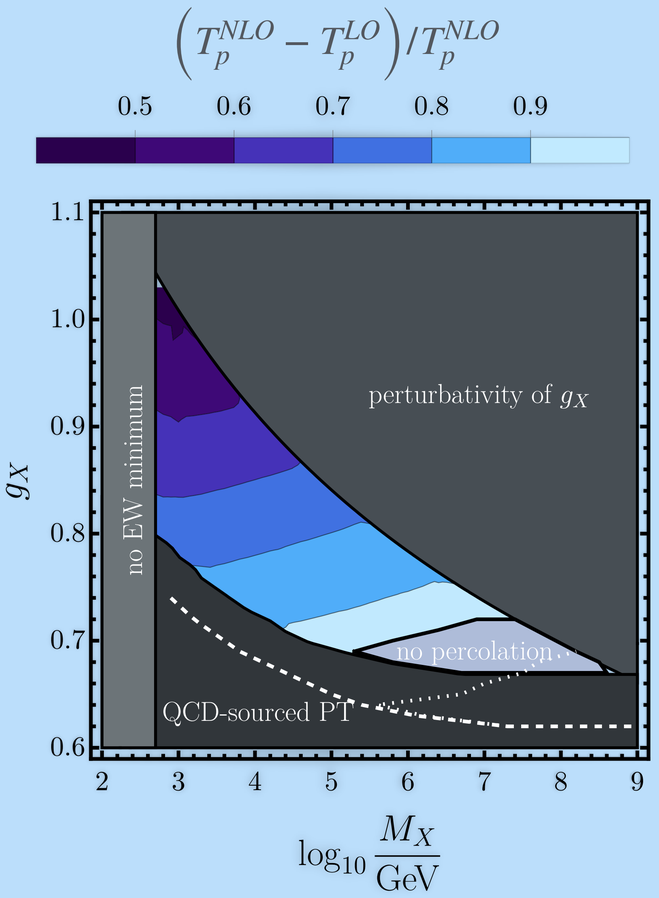
Scale-shifters



Non-local effects!

Results

Higher-order thermal corrections can and should be included in models with supercooled PT



NLO effects modify "daisy" results significantly, but there are caveats: Z-factor and scale-shifters

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