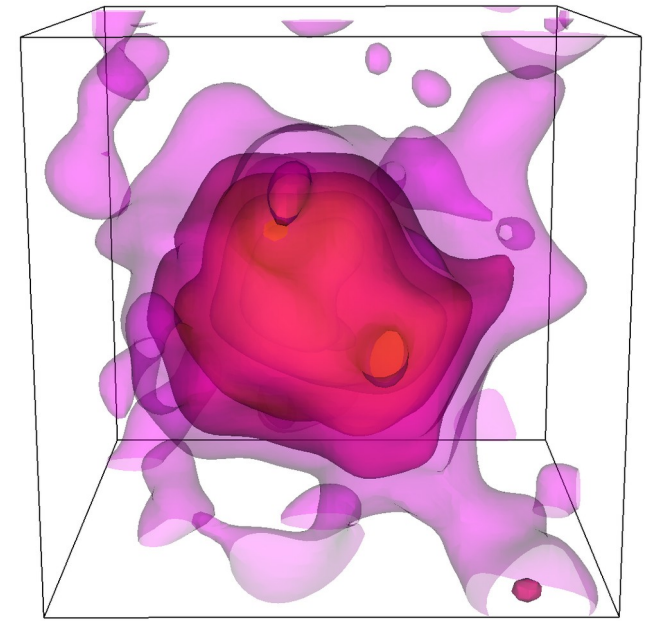
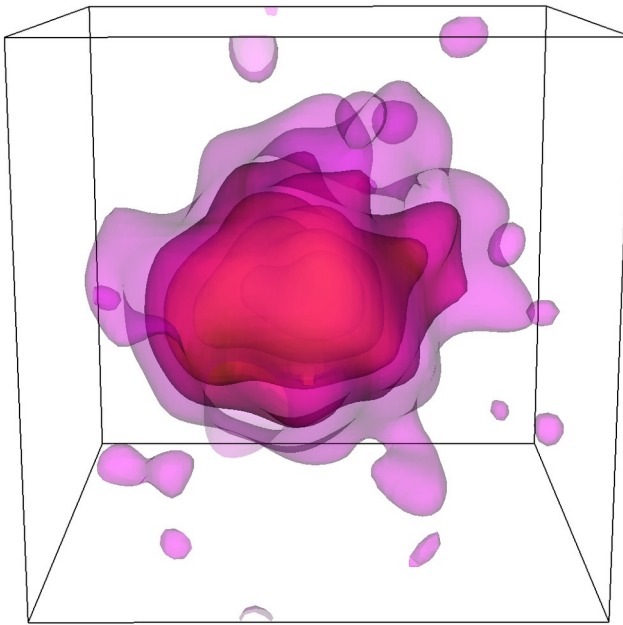
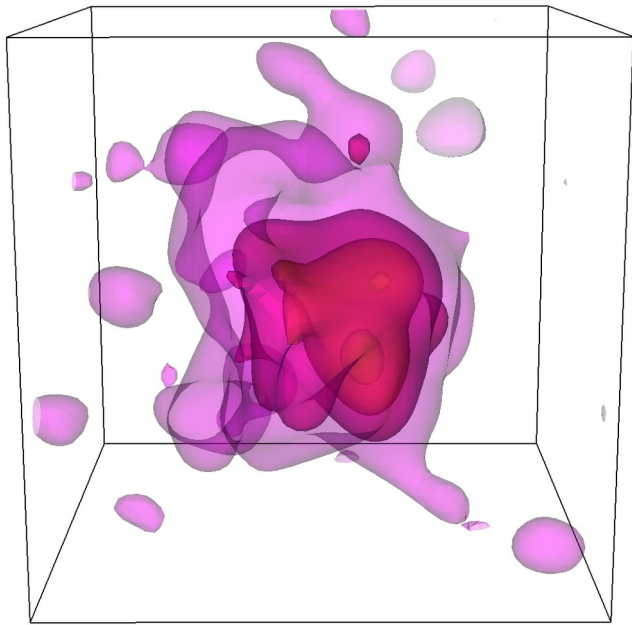


Bubble nucleation in $SU(8)$ deconfinement transition



Riikka Seppä

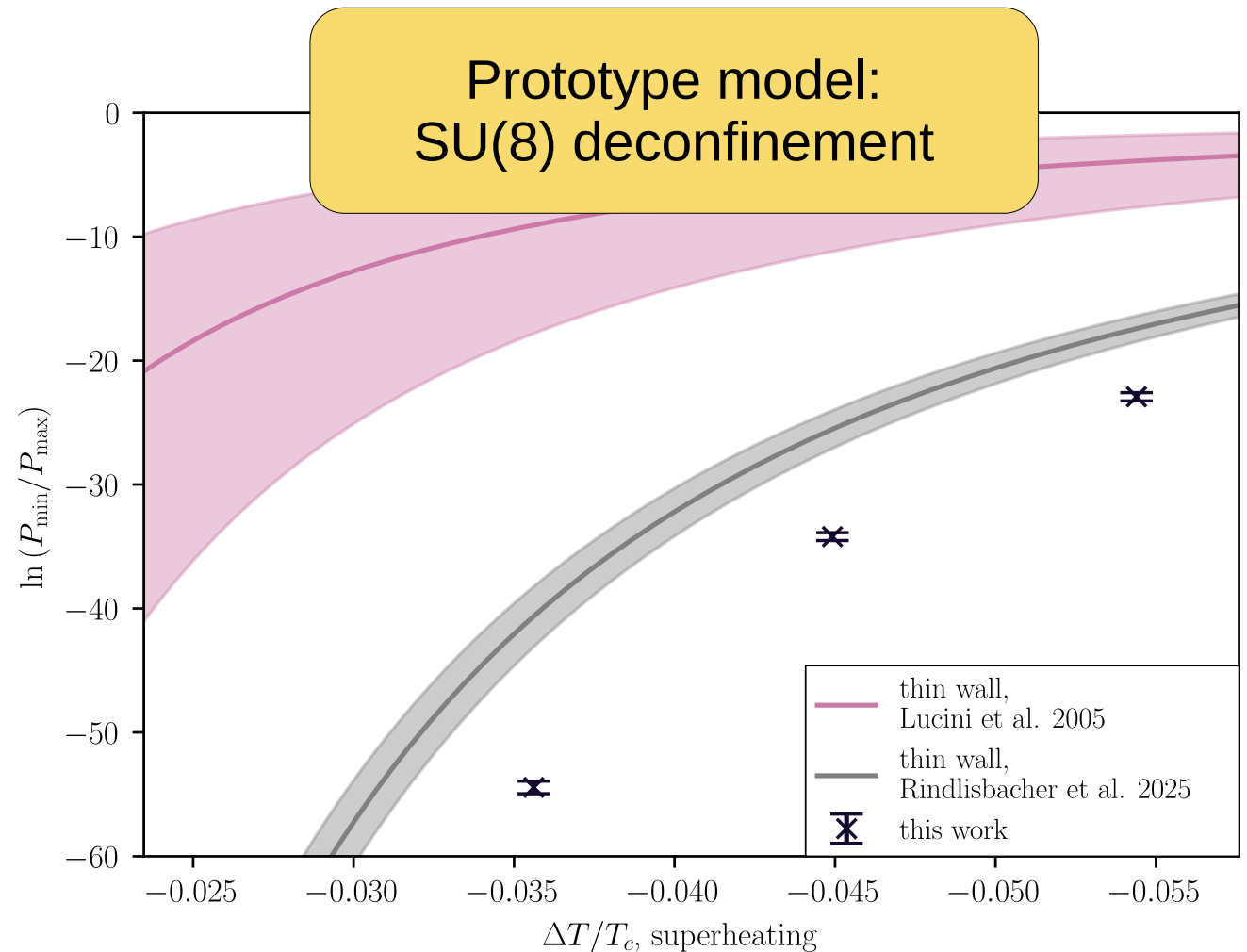
University of Helsinki

BSM Odyssey 2025, 22.7.2025

with
Kari Rummukainen
David Weir

SU(N) confinement transition

- DM models with a first order confinement transition using SU(3), SU(4)..
see e.g [arXiv:2006.16429] [arXiv:2012.11614]
- **Bubble nucleation rate** so far only with semianalytical methods
- Can the rate be obtained **non-perturbatively from lattice?**

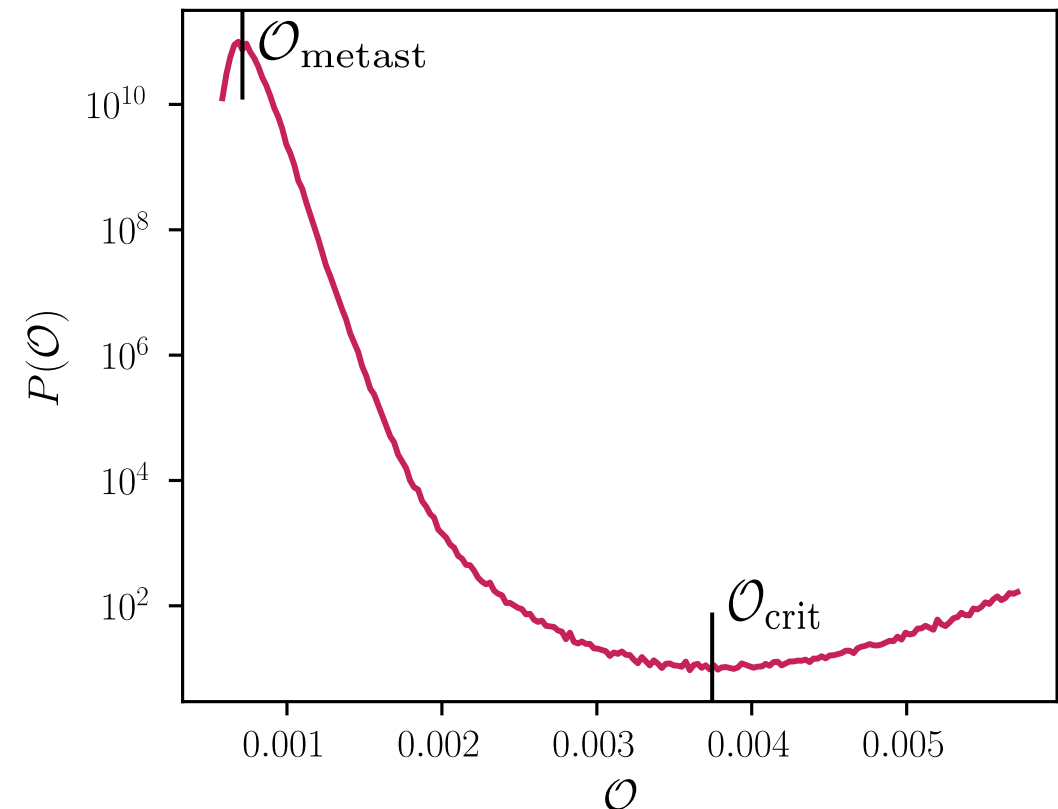


Nucleation rate from the lattice

$$\text{Rate } \Gamma \sim A_{\text{dyn}} \exp(-F)$$

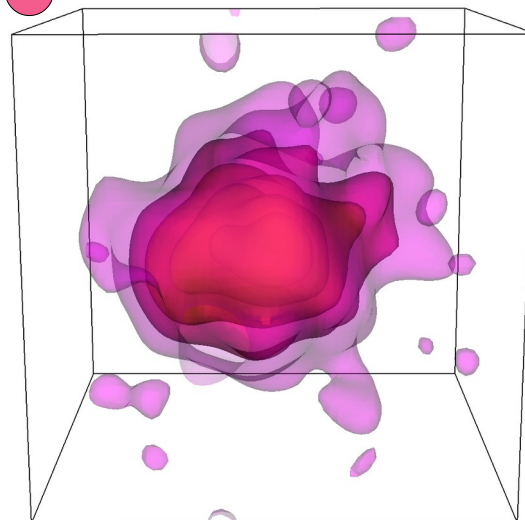
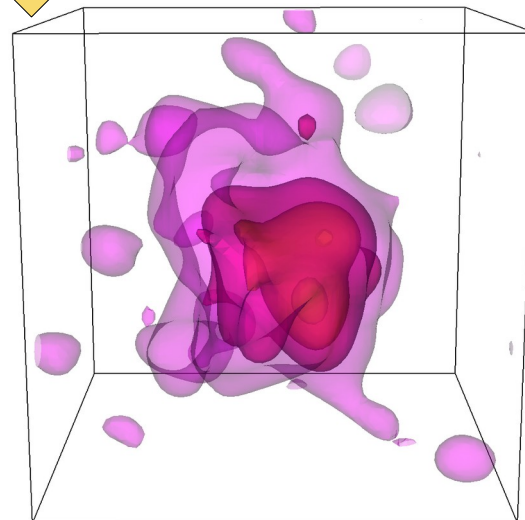
- 4D finite temperature simulation
- Generate configurations with multicanonical Monte Carlo and measure **order parameter** $\mathcal{O}$
- The free energy F of the **critical bubble**:

$$F \sim -\log \frac{P(\mathcal{O}_{\text{crit}})}{P(\mathcal{O}_{\text{metast}})}$$

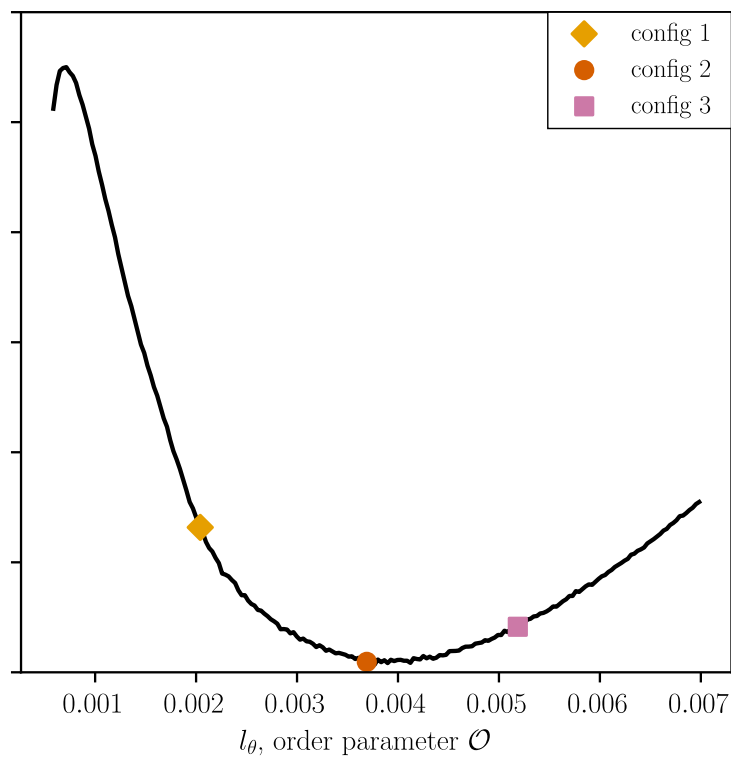
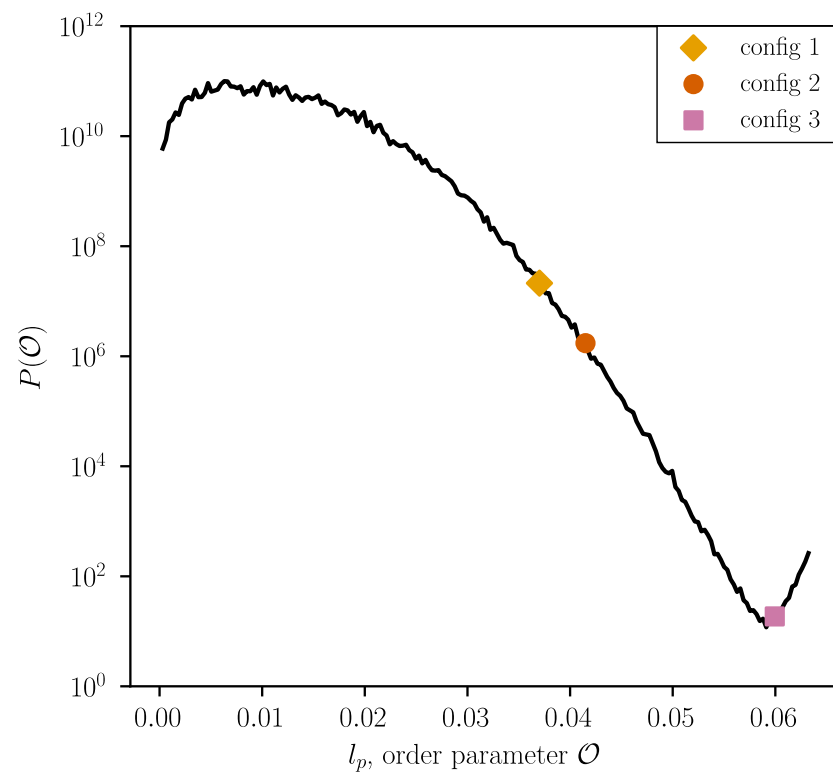
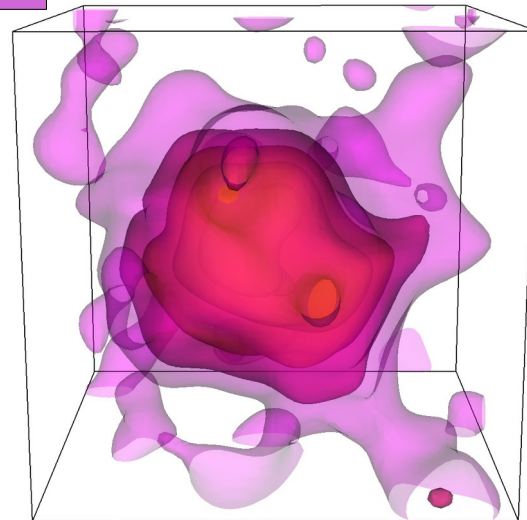


Polyakov loop order
parameter:

'Old' l_p
vs.
Improved l_θ



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Thank you!

