

# Finite temperature twisted mass Wilson fermion ensembles

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in collaboration with **M.P. Lombardo, A. Trunin**



**Lattice 2022**

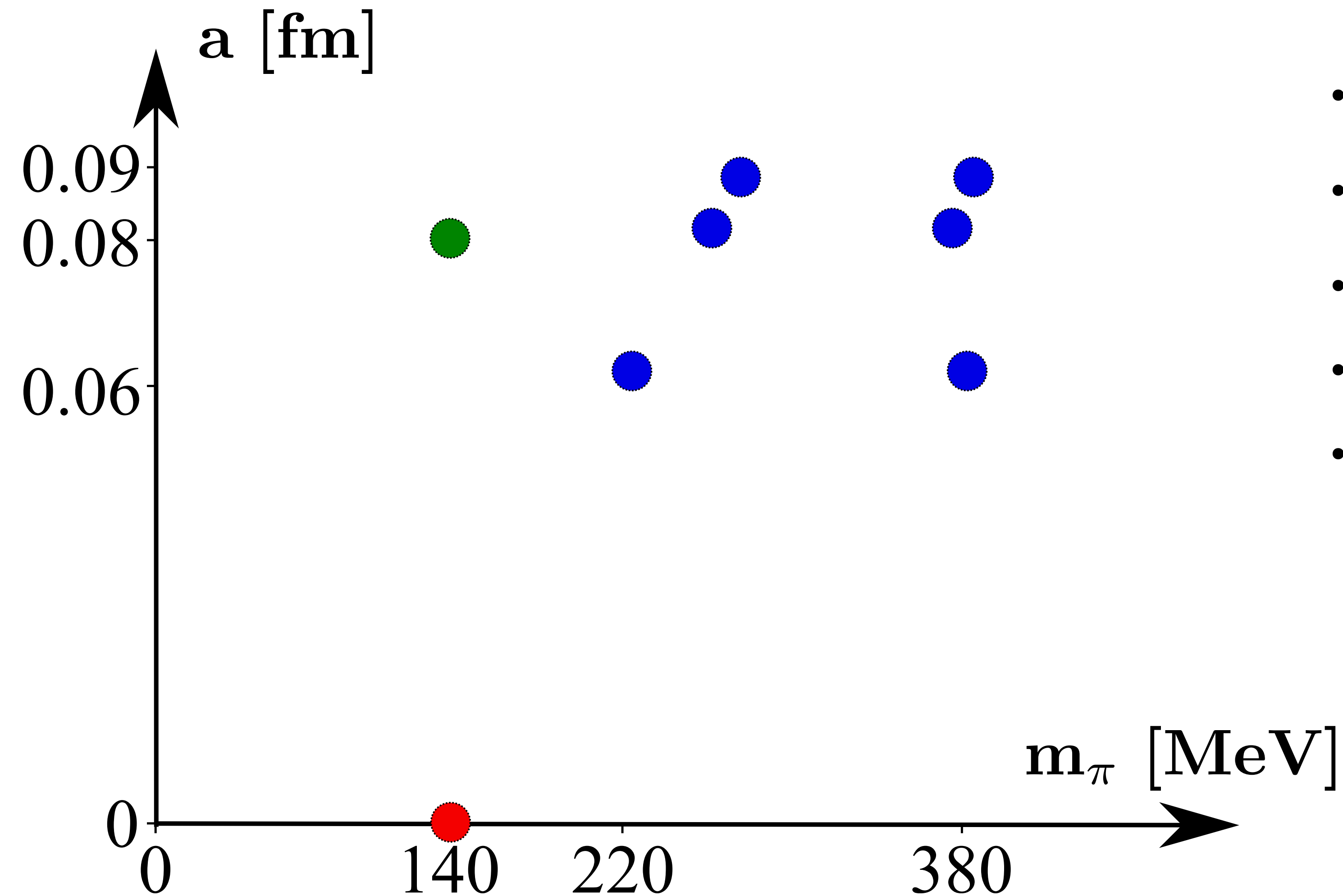
# Details of the simulations

- $N_f = 2 + 1 + 1$  **twisted mass** Wilson fermion (with and without clover term)
- Iwasaki gauge action
- Standard HMC algorithm, multigrid algorithm for Dirac inversions
- **Finite temperature**  $T \in (\sim 120, 600 - 800)$  MeV
- «Fixed scale» approach:  $a = \text{const}$ ,  $T \Leftrightarrow N_t$
- Public ETMC code, run on CPUs

[Alexandrou et al., 2016]

[<https://github.com/etmc/tmLQCD>]

# Ensemble summary



- **Blue:** Wilson twisted mass,  $1k - 10k$  configs per T
- **Green:** Wilson-clover twisted mass,  $O(500)$  configs per T
- **Red:** physical point
- Each point:  $O(10 - 20)$  values of  $N_t$
- $T \in (\sim 120, 600 - 800)$  MeV
- Each point: one or two spatial volumes
- Configurations separated by several MD traj.

Detailed summary: [\[Burger et al., 2018\]](#)  
[\[AK, Lombardo, Trunin, 2021\]](#)

# Collected metadata

## In the header of the file

- **Parameters** of the runs (lattice size, beta, bare quark mass etc.)
- **Plaquette**
- Date and time of generation, MD trajectory number
- Code version
- Precision (double)
- **Checksum**: was very useful to detect disk failures

# Data management

- Total space: 26 TB
- Stored at CINECA
- Two (or three) different copies (SCRATCH/DRES, another machine)

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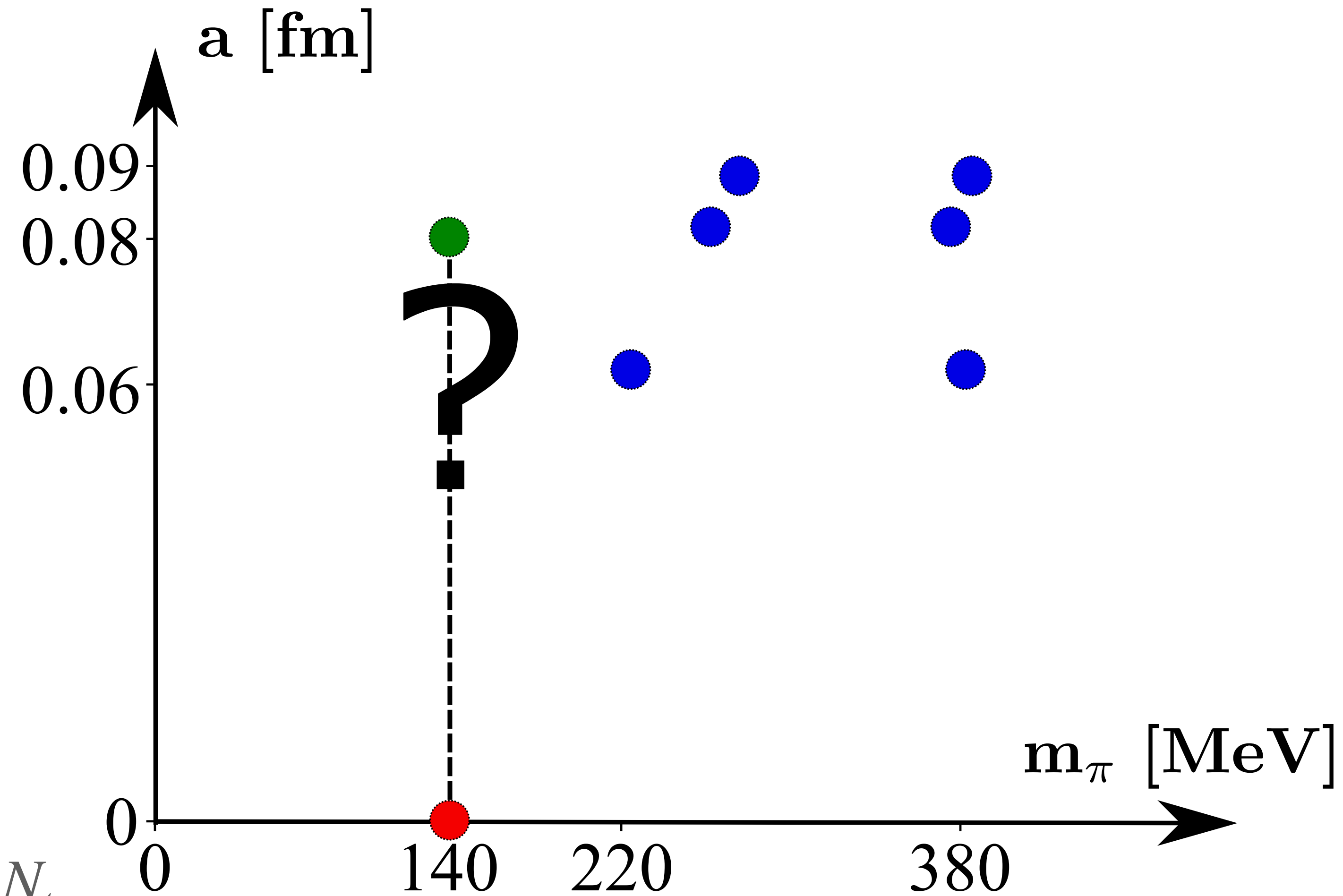
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# Data availability

- Not available to everyone: ongoing analysis
- Available at request/open for collaborations
- Future plans: after analysis we plan to make public

# Future plans

- Finer lattice spacings for  $m_\pi = 140$  MeV
- After analysis: plan to make public



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