

*Chiral phase transition with 2+1 flavor
lattice QCD simulation at physical point
with Moebius domain wall fermion*

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Buenas Ideas on the QCD Phase Diagram at YITP

Ref. IK, Y.Aoki, H.Fukaya, J.Goswami, S.Hashimoto, Y.Zhang (JLQCD)
PoS (Lattice2025) [arXiv:2603.23022]



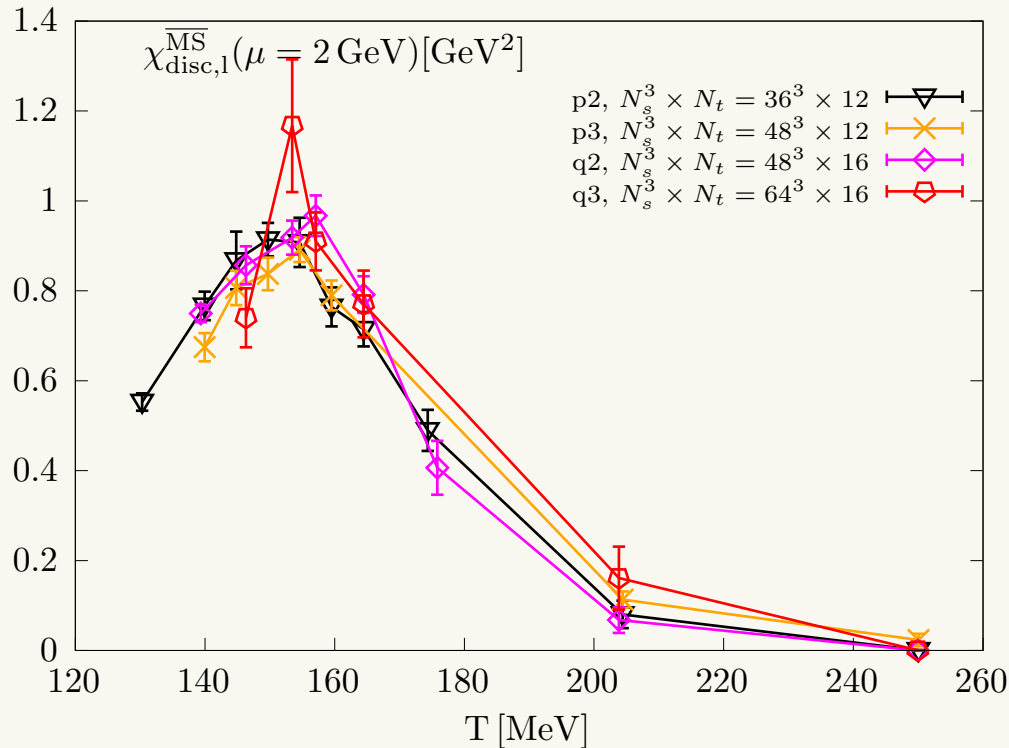
Simulation Setup

- Action:
 - gauge: Symanzik
 - fermion: $N_f = 2 + 1$ Möbius Domainwall fermion with stout smearing
- 5th-dir extent: $L_5 = 12$
- Lattice size:
 - $N_t = 10$: $40^3 \times 10$ (high-T, up to 500 MeV)
 - $N_t = 12$: $36^3, 48^3 \times 12$ (up to 250 or 300 MeV)
 - $N_t = 16$: $48^3, 64^3 \times 16$ (up to 250 MeV)
- parameters: along the line of constant physics at physical point $m_l = m_s/27.4$
 - quark masses are carefully chosen by considering the residual mass m_{res}
- Code set: GRID, Hadrons, Bridge++
- Resources: Fugaku (hp210165, hp220174, hp230207, hp240213, hp250224, ra000001)

cf. talk by Junxiong Nie (yesterday)

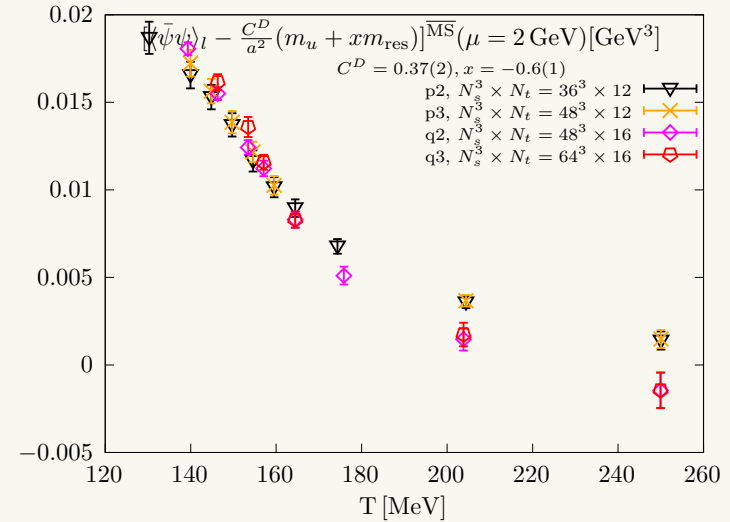
Results

disconnected chiral susceptibility
multiplicatively renormalized

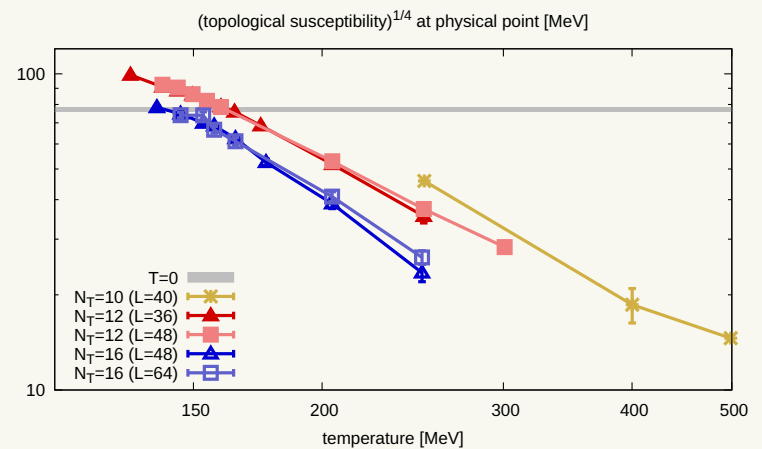


$T_{pc} \sim 153-157 \text{ MeV}$

Chiral condensate



Topological susceptibility



(MDWF has much smaller finite a -effect than staggered result)