

CP-PACS and JLQCD Full QCD experience

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■ CP-PACS two-flavor run (1997-1999)

- *R_G-improved glue + clover quark (tadpole c_{sw})*
- spatial size $L \approx 2.4 \text{ fm} \quad (12^3 \times 24 - 24^3 \times 48)$
- seq quark mass $m_\pi / m_\rho \approx 0.8 - 0.6$
- lattice spacing $a^{-1} \approx 1.0 - 2.0 \text{ GeV}$
- statistics $7000 - 4000 \text{ traj.} \approx 100 \text{ indep. configs}$
- total CPU time for config. generation **236 CP-PACS days**
0.6 Tflops peak / 0.2 Tflops sustained

◆ FLOP estimates

$$\#FLOP's = C \cdot \left[\frac{\#conf}{1000} \right] \cdot \left[\frac{m_\pi / m_\rho}{0.6} \right]^{-6} \cdot \left[\frac{L}{3 \text{ fm}} \right]^5 \cdot \left[\frac{1/a}{2 \text{ GeV}} \right]^7 \text{ Tflops} \cdot \text{year}$$

$C \approx 2.8$

assumptions(empirical):

- inversion $N_{inv} \approx \text{const} / m_q a$
- step size $\delta\tau \approx \text{const} \cdot m_q \cdot \frac{a}{L}$ (*least known*)
- auto correlation $\tau_{int} \approx \text{const} / m_q a$

■ JLQCD two-flavor run (2000-2001)

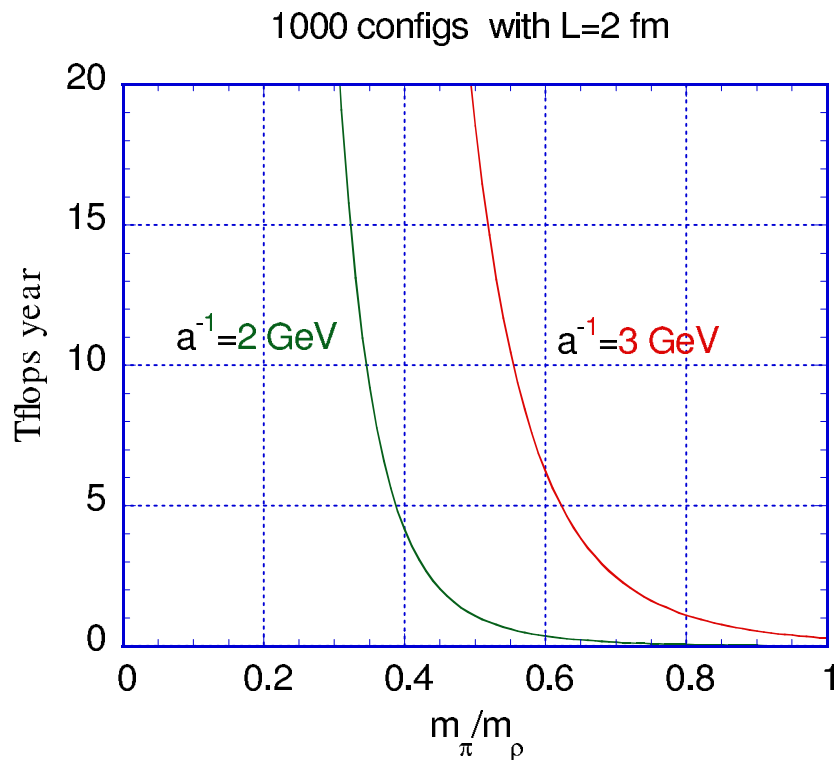
- *plaquette glue + clover quark (NP c_{sw})*
- spatial size $L \approx 1.2 - 2.0 \text{ fm} \quad (12^3 \times 48 - 20^3 \times 48)$
- seq quark mass $m_\pi / m_\rho \approx 0.8 - 0.6$
- lattice spacing $a^{-1} \approx 2.0 \text{ GeV}$
- statistics $6000 \text{ traj.} \approx 100 \text{ indep. configs}$
- total CPU time for config. generation **75 SR8000 days**
1.2 Tflops peak / 0.4 Tflops sustained

◆ FLOP estimates

- very similar characteristics
- numerically also similar $C_{CP-PACS} \approx C_{JLQCD}$

Tflops years estimate for $N_f = 2$ Full QCD

$$\#FLOP's = 2.8 \cdot \left[\frac{\#conf}{1000} \right] \cdot \left[\frac{m_\pi / m_\rho}{0.6} \right]^{-6} \cdot \left[\frac{L}{3fm} \right]^5 \cdot \left[\frac{1/a}{2GeV} \right]^7 Tflops \cdot year$$



Improved gauge
actions + HMC
algorithm

