# Simulations at the Physical Point

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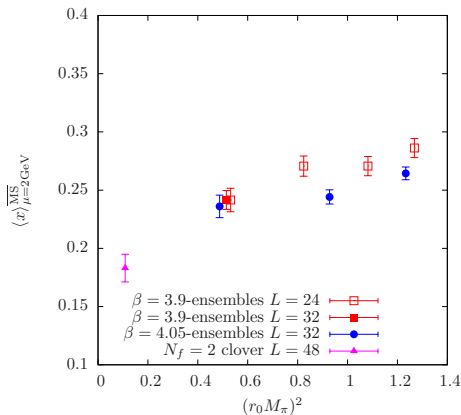etmcsim@googlegroups.com

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- $\langle x \rangle_{u-d}$ of the pion

- order 200 configurations per ensemble

- renormalisation from ETMCs arXiv:1104.1600 and from Martha
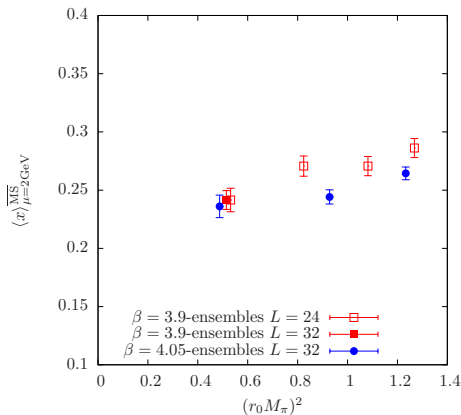
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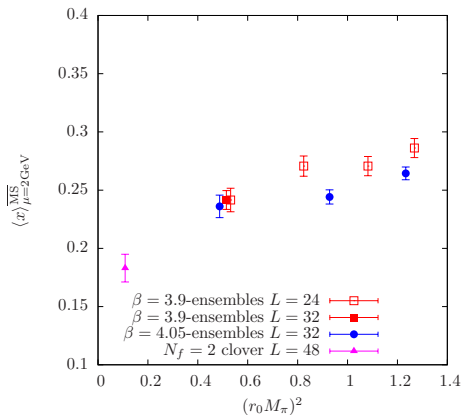
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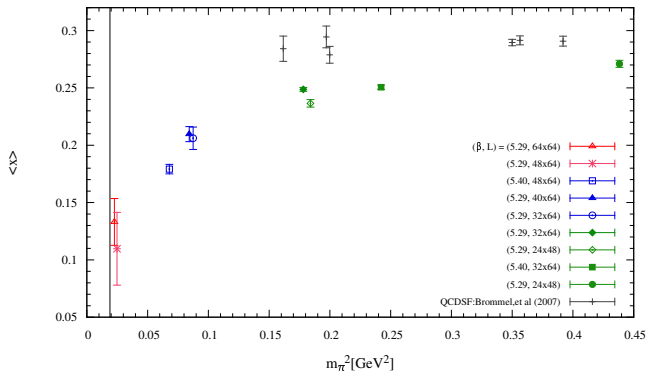- renormalisation from ETMCs arXiv:1104.1600 and from Martha

$\Rightarrow$ largely reduces systematic uncertainties



- I could not find $\beta = 4.20$ gauges on the GRID :(

- even more interesting (Bali et al., (2013))



- large error bars, but a tension at the physical point...

# Status $N_f = 2$ with Clover Term

- at the physical point $\mu = 0.0009$:
  - $48^3 \times 96$ volume
  - $> 5000$ trajectories

- two small volume runs with $24^3 \times 48$
  - $\mu = 0.003$: 1000 trajectories, $M_\pi \cdot L < 2$
  - $\mu = 0.006$: $\approx 2000$ trajectories, $M_\pi \cdot L < 3$

- many results are being computed
  - pseudoscalar meson quantities
  - baryonic quantities
  - renormalisation constants
  - else...?

- currently sort of a workhorse for many sub-groups

- how do we treat systematic uncertaities from
    - lattice artifacts?

    - finite size corrections?

- I think we have to connect to previous $N_f = 2$ data at large mass!
    - maybe we need $L = 32$ simulations for this?
      (which we cannot affort right now)

    $\Rightarrow$ need to be done on a machine $\neq$ BG/Q!

- the clover term helped to overcome the problem with light quark masses

- $N_f = 2 + 2$ (light+strange) worked well
  - metastabilities seems to be absent
  - tuning in the valence sector worked

- with the heavy $1 + 1$ doublet and clover we hit problems

$\Rightarrow$ does the clover+charm lead to problems
interplay of the clover term with large $am_c$?

$\Rightarrow$ is there a tuning problem with the charm
charm much heavier than expected?