

These are some notes of our Rome meeting compiled by Olivier and Karl.

We have decided to meet again on the 31.3.06 in Zeuthen to update ourselves. We should try to communicate as much as possible via e-mail and put first results on the net. Eventually we should have a collaboration name (TMC ???) and a Logo

It has also been suggested that Karl tries to coordinate our activities

Presentations:

Vittorio Lubicz, introduction

Karl Jansen, Status Wilson Twisted Mass Fermions

Andrea Shindler, Algorithmic developments

Silvano Simula, Status quenched twisted mass with clover term

Giancarlo Rossi, theoretical status of twisted mass

Roberto Frezzotti, explanation of effect of gauge action on phase structure

Istvan Montvay, Status of $N_f=2+1+1$

Marten Golterman, Discussion of $O(a^2)$ effects in mixed action approach

Proposal (by K.J.)

2 lines of actions:

- A) Scaling test with $N_f=2$ flavours of quarks using Wilson twisted mass fermions and the tree-level Symanzik improved gauge (tlSym) action
- B) Test and explore alternative formulations, renormalization and $N_f=2+1+1$

A) We have already good information about $N_f=2$, Wilson twisted mass+tlSym
-- we know the starting point where we can reach $m_\pi < 300\text{MeV}$ and are not affected by the metastability phenomena or long autocorrelation times
the programs are ready, also a tao code for apeNEXT, which needs however still some optimization

Plan: 3 lattice spacings, $a=0.09, 0.075, 0.05\text{fm}$
Volume: $L > 2\text{fm}$
Pion mass 250-500MeV

Start: $\beta=3.9$ ($a=0.09\text{fm}$): $\kappa=0.1609$, $\mu=0.004, 0.0052, 0.0064, 0.0075$
At these parameters run three volumes: $16^{332}, 24^{348}, 32^{364}$
(this would nicely check for finite volume effects)

Next: $a=0.075$ (estimated $\beta=4.05$), with scaled values of μ and $V=32^{364}$

Last: $a=0.005$ ($\beta=?$), scaled values of μ , $L=48^{396}$

It is to be explored how much of the last step of this scaling test can be done in practice

B) Alternative formulations, other aspects

There are a number of open questions and further developments in the twisted mass approach that needs to be explored in parallel and for which computertime should be allocated. Compared to A) we had the feeling that a ratio of 75%(A) to 25%(B) would be a fair and appropriate choice

- i) Twisted mass with a clover term
- ii) Beta dependent coefficient of the rectangular Wilson loop
- iii) Stout smeared Dirac operator
- iv) Non-perturatively $O(a)$ -improved Wilson fermions
- v) Renormalization (SF vs RI-MOM)
- vi) $N_f=2+1+1$
- vii) Mixed actions
- viii) Disconnected correlators

Activities of People

We list statements of people who have been at the meeting about their preferences. It should be clear that the sub-projects are open and can be joined, in principle, by everybody. It has also to be said that some people could not join the meeting, who are all still interested in participating, e.g.

C. Urbach, U. Wenger, K. Nagai, C. Michael, G. McNeille, J. Pickavance, O. Bär, F. Farchioni, G. Münster

(If people are forgotten, please let me know, K.J.)

Damir Beciveric

Developing the clover code and $n_f=2+1$ (B)

Philippe Boucaud

Contribute to optimise code (A) with Karl Jansen and Dirk Pleiter and then develop clover (B)

Thomas Chiarapa

help on the runs (A), $n_f=2+1+1$ (codes development) (B)

Roberto Frezzotti

Follow runs and perform a first test in (A), go on with $n_f=2+1+1$ (B)

Karl Jansen

Optimise code + analysis (A), maybe contribute develop clover (B)

Vittorio Lubicz

work at some light mass, and 0.09 lattice spacing in both approaches, look at the negative quark mass to see phase transitions. (A+B)

Federico Mescia

Analysis (A)

Istvan Montvay and Federico Farchioni

$N_f=2+1+1$ (B)

Mauro Papinutto

Collaborate on development of clover codes (B)

Olivier Pène

Help to run + analysis (A)

Giancarlo Rossi

Theoretical developments

Luigi Scorzato

Participate in the analysis (A) and $n_f=2+1+1$ (B)

Andrea Shindler

porting the general HMC C code on apeNEXT. + (to be seen) (A+B)

Silvano Simula

Participate in the analysis (A)

Cecilia Tarantino

Follow the run (A) then goes to Munich

Tassos Vladikas, Gregorio Herdoiza and ???,

B_K in (A), renormalisation with Schrödinger functional (B)

Oliver Bär + Stefan Schäfer + Luigi Scorzato

mixed action : overlap on twisted mass configuration, flavor braking.