Status of N_f=2 and 2+1+1 runs

Rémi Baron

CEA Saclay

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Outline

Run parameters

- Gauge action tree level Symanzik
- All running on BG/P

β	TxL^3	κ	aμ	am_π	am_{PCAC}	af_π	τ	#traj analyzed	status
4.2	96x48^3	0.154079	0.002	0.0754(3)	0.00010(9)	0.0399(2)	6	2458	stopped
4.2	96x48^3	0.154073	0.002	0.0729(5)	-0.00006(7)	0.0402(7)	6	1279	running

(τ is plaquette autocorrelation)

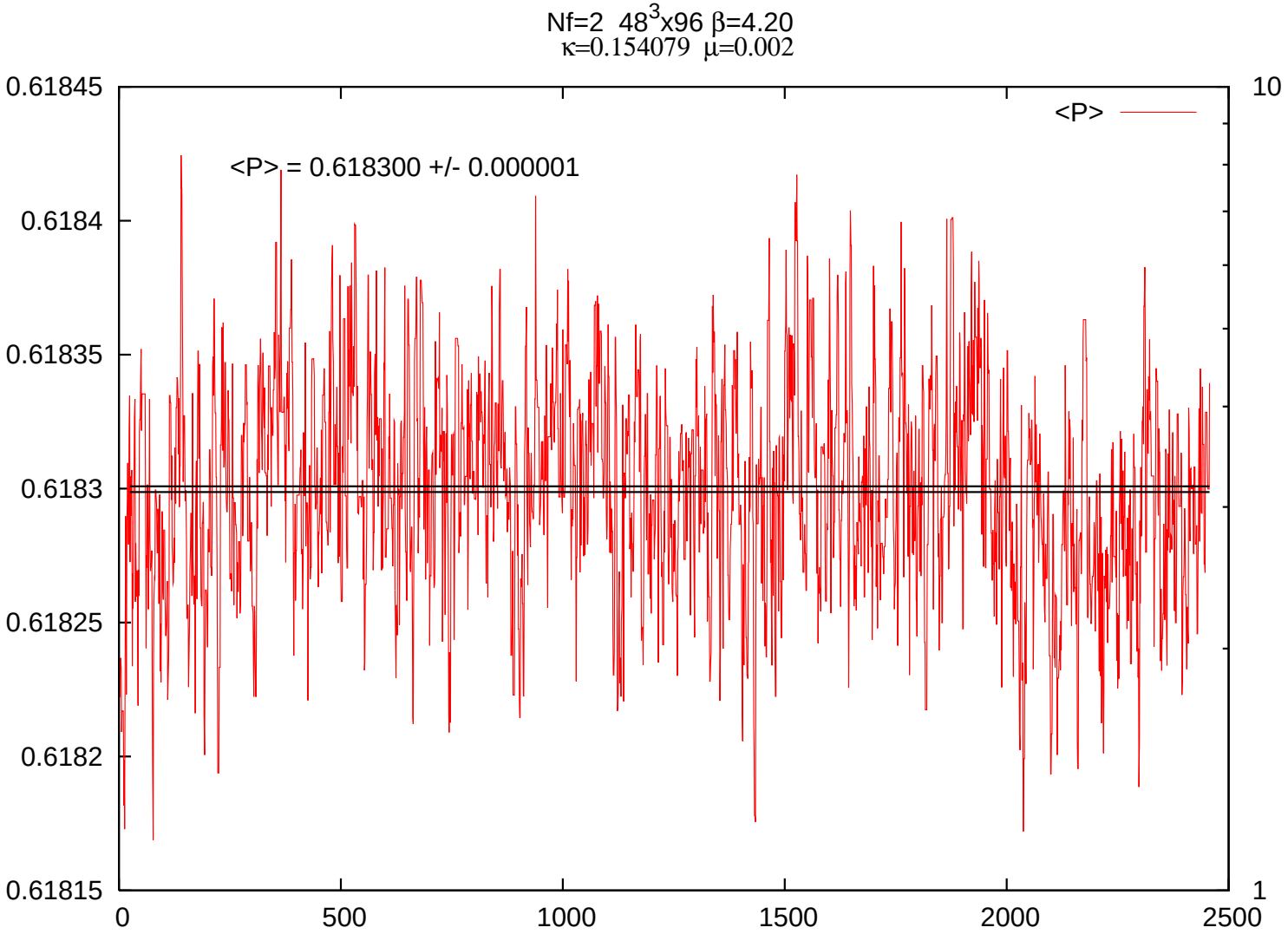
- Urs has found r_0/a = 8.486(122) (for κ=0.154079)
- Olivier has started ensemble tlSym_b4.20_L24T48_k0.154073_mu0.002 (now on ApeNEXT)

Run parameters

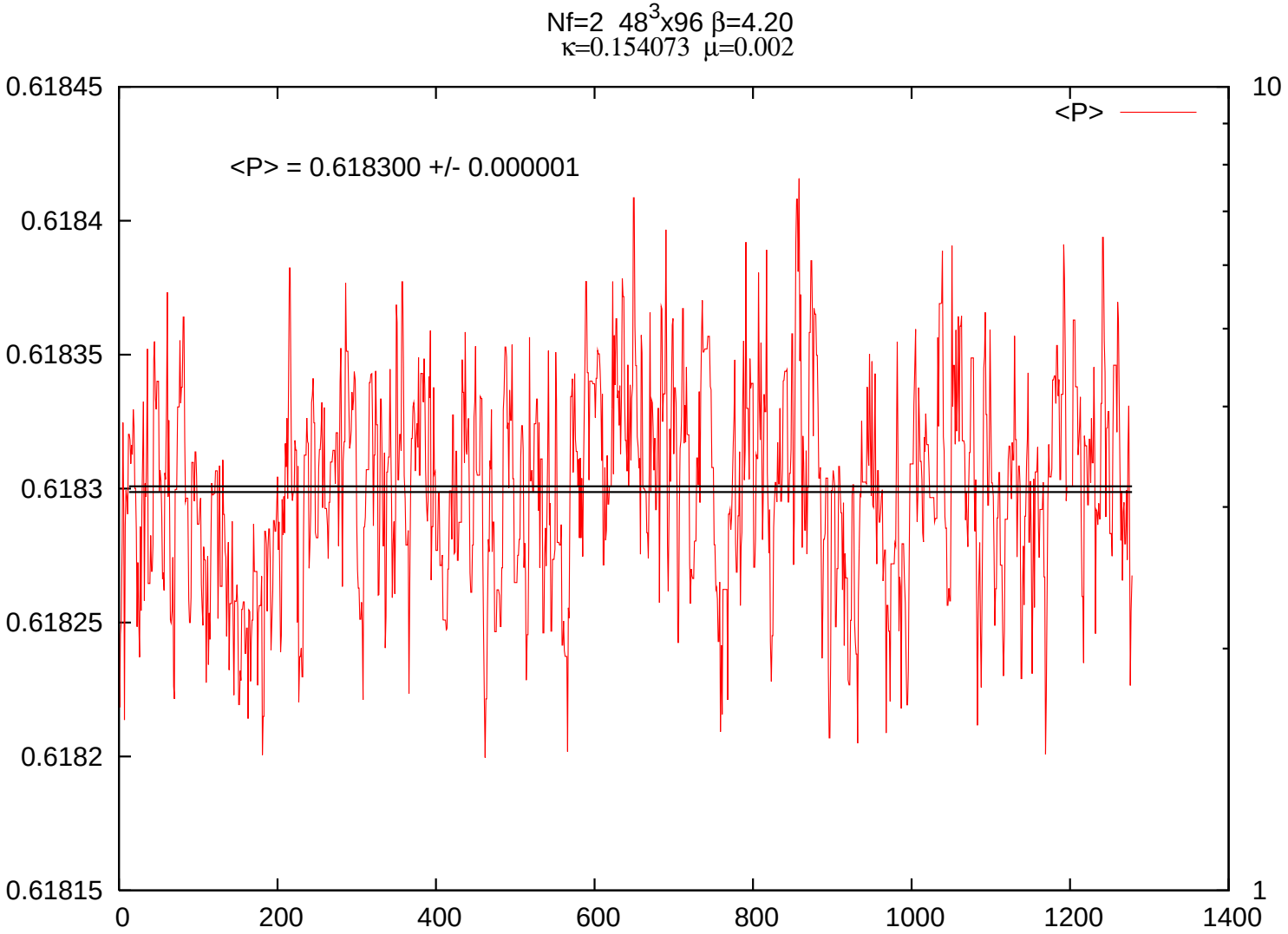
- New run at β=4.2 started
- m_π will be $\sim$ 480Mev
- Matching aμ=0.0080 at β=4.05 and aμ=0.0100 at β=3.9
- More than 650 trajectories already

β	TxL^3	κ	aμ	status
4.2	64x32^3	0.154073	0.0065	running

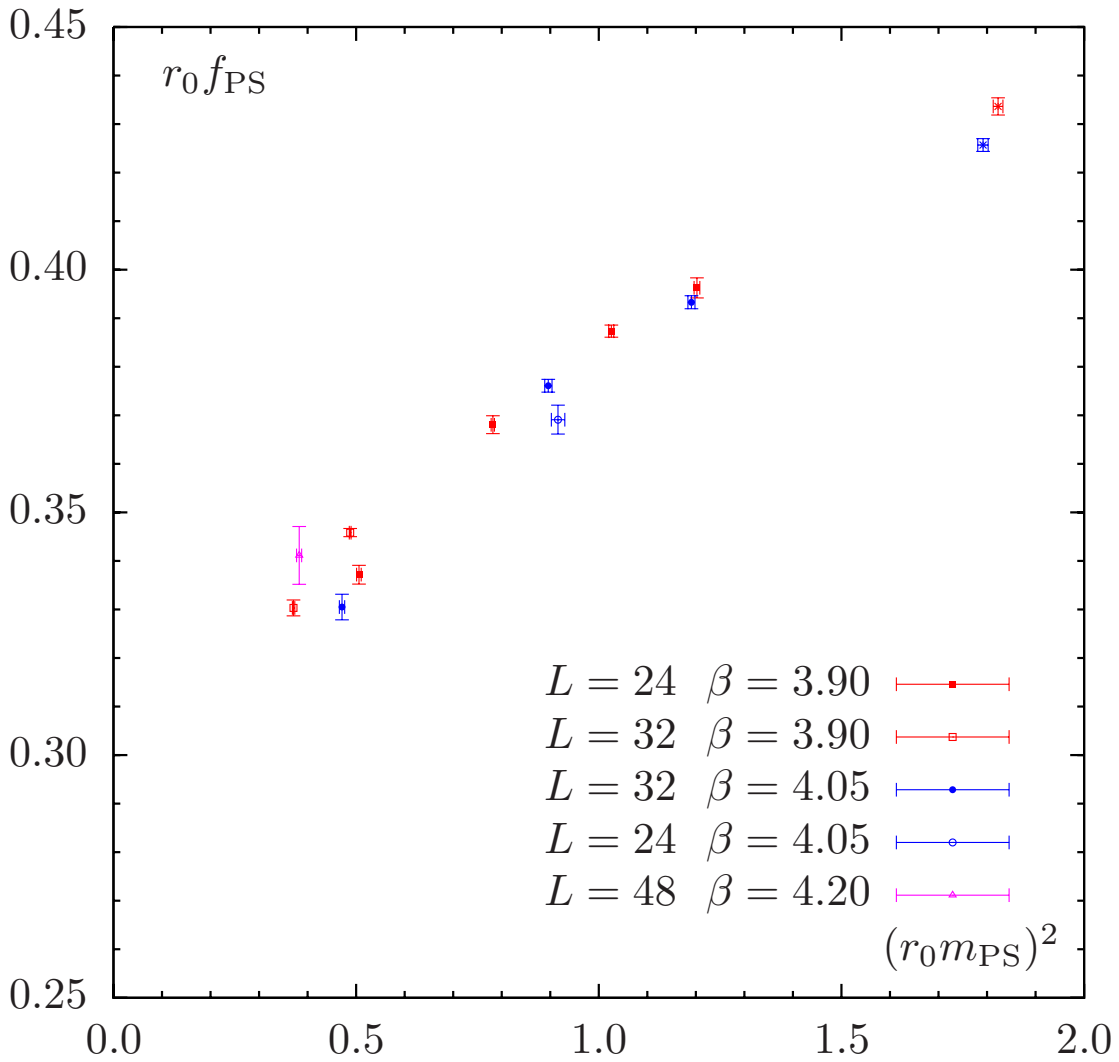
MC histories



MC histories



Preliminary plot



Outline

Run parameters

- $\beta = 1.9$

β	TxL^3	κ	aμ	μ_σ	μ_δ	status
1.9	48x24^3	0.163270	0.004	0.15	0.19	stopped
1.9	48x24^3	0.163265	0.006	0.15	0.19	stopped
1.9	48x24^3	0.163260	0.008	0.15	0.19	stopped
1.9	48x24^3	0.163255	0.010	0.15	0.19	stopped
1.9	64x32^3	0.163270	0.004	0.15	0.19	running

- $\beta = 1.95$

β	TxL^3	κ	aμ	μ_σ	μ_δ	status
1.95	64x32^3	0.16124	0.0035	0.135	0.17	running

Run parameters

For those running

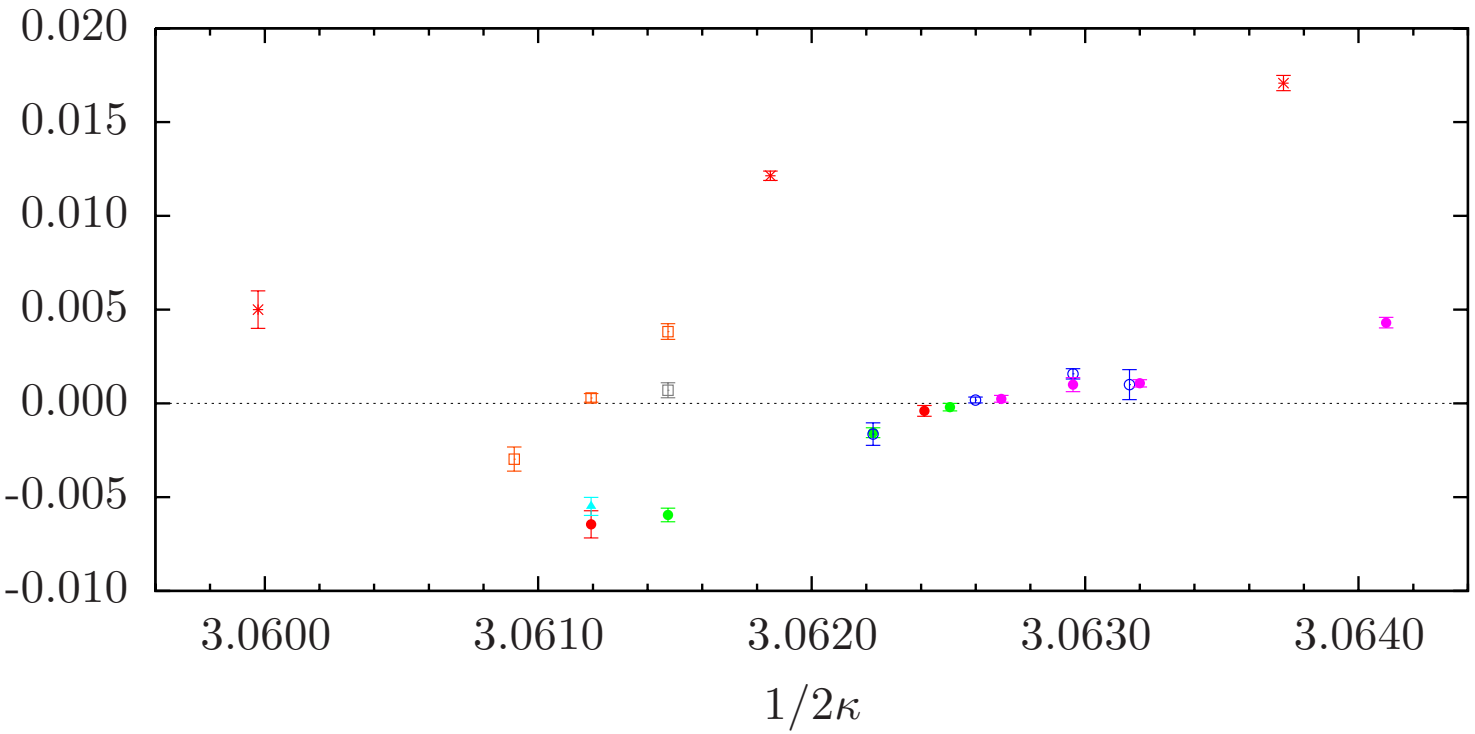
- $\beta = 1.9$

am_π	am_{PCAC}	af_π	τ	#traj analyzed
0.1432(3)	0.00046(23)	0.0673(3)	50	3039

- $\beta = 1.95$

am_π	am_{PCAC}	af_π	τ	#traj analyzed
0.128(1)	0.00001(16)	0.0598(3)	47	4141

Tuning summary



$\beta = 1.90 \quad \mu = 0.0040 \quad \mu_\sigma = 0.110 \quad \mu_\delta = 0.090$
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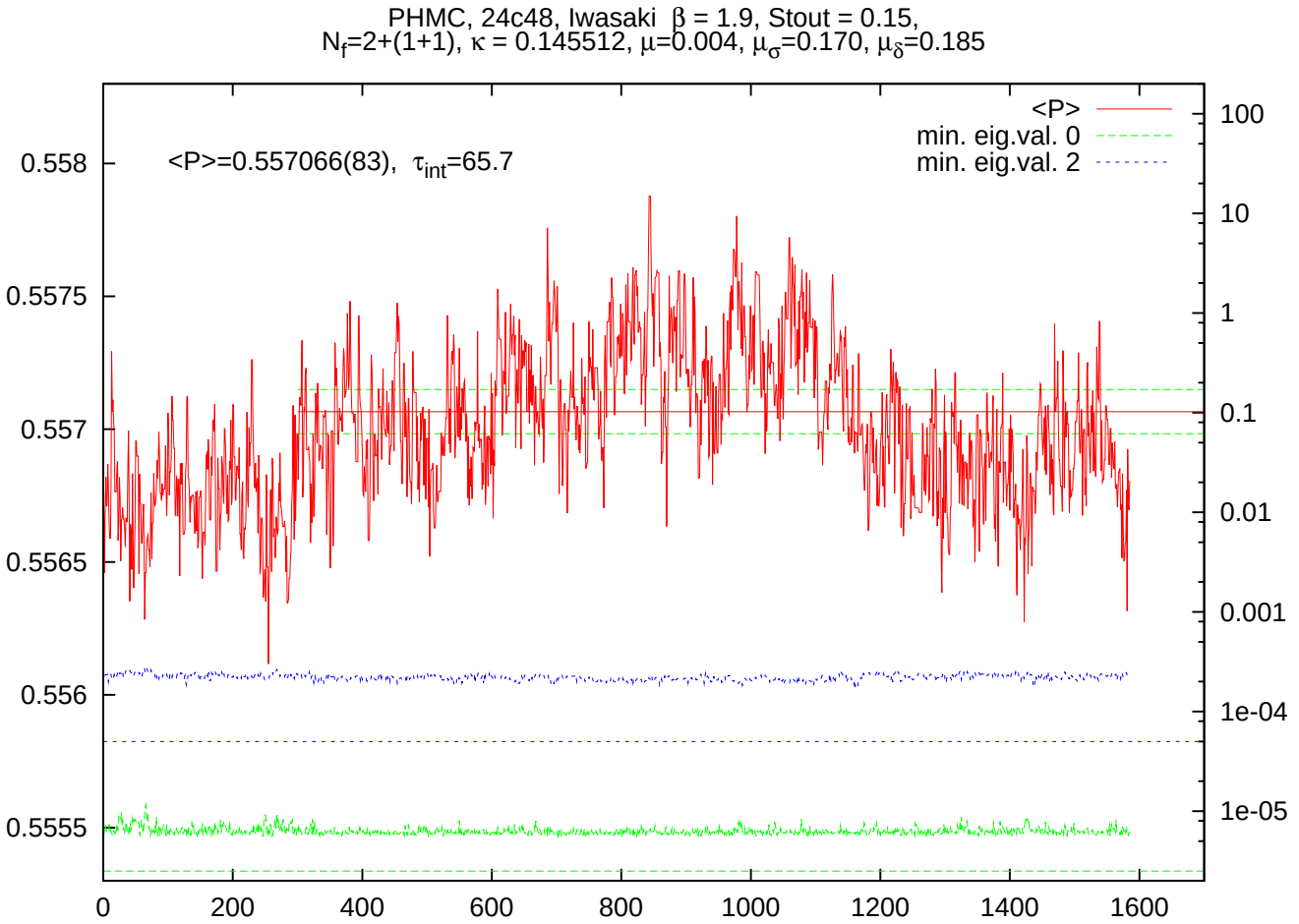
$\beta = 1.90 \quad \mu = 0.0100 \quad \mu_\sigma = 0.150 \quad \mu_\delta = 0.190$
$\beta = 1.90 \quad \mu = 0.0040 \quad \mu_\sigma = 0.185 \quad \mu_\delta = 0.236$

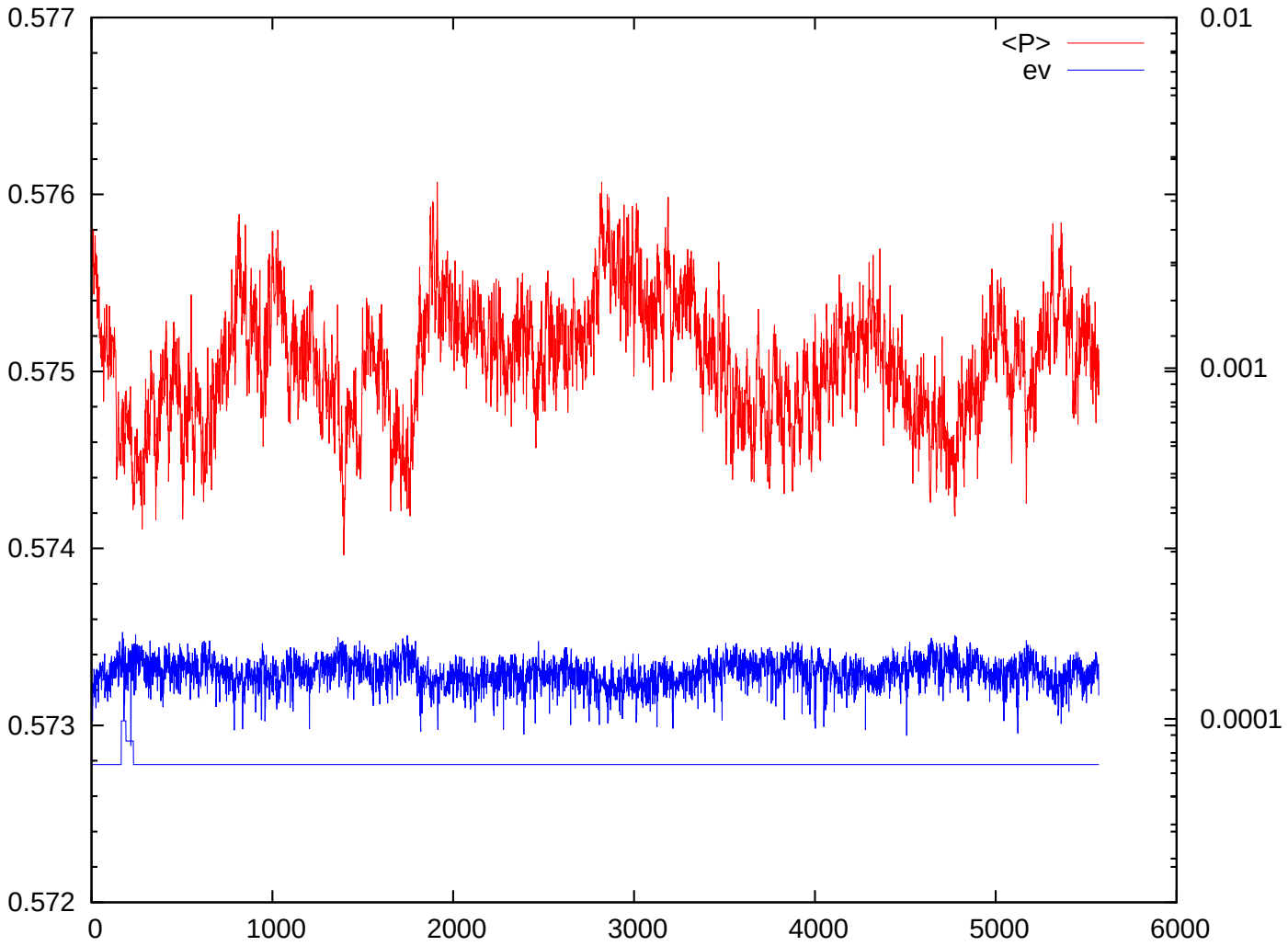
Stout and no-stout

	κ	am_π	am_{PCAC}	r_0/a	τ^{plaq}
stout	0.145512	0.1224(17)	-0.00084(31)	4.97(8)	65.7
no-stout	0.163270	0.144483(756)	-0.000395(288)	5.087(50)	125(50)



Stout and no-stout

- Run without stout (L24T48_b1.90_k0.163270_mu0.004_mubar0.15_eps0.19)



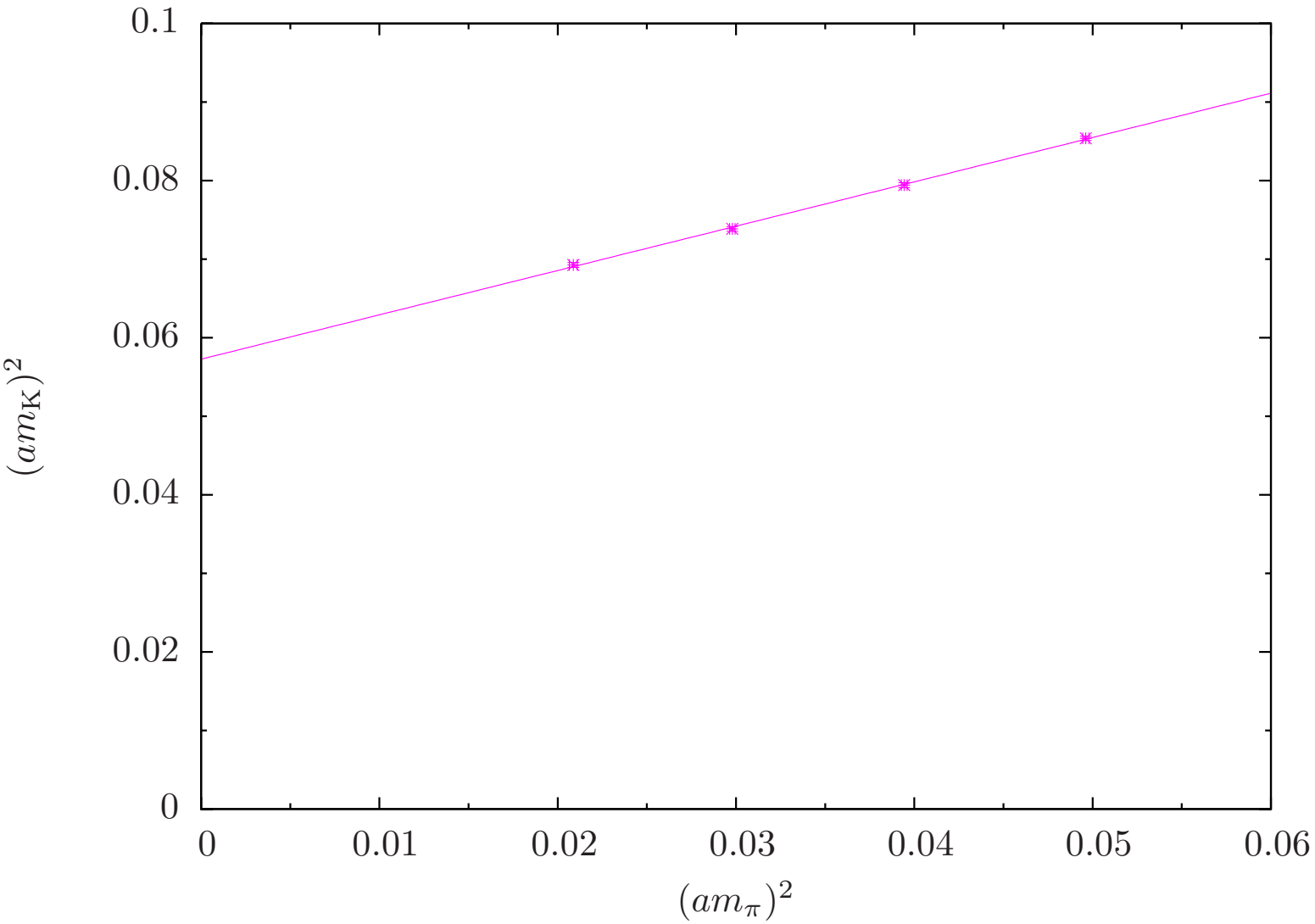
Light/heavy sector data

- L=24, β = 1.9

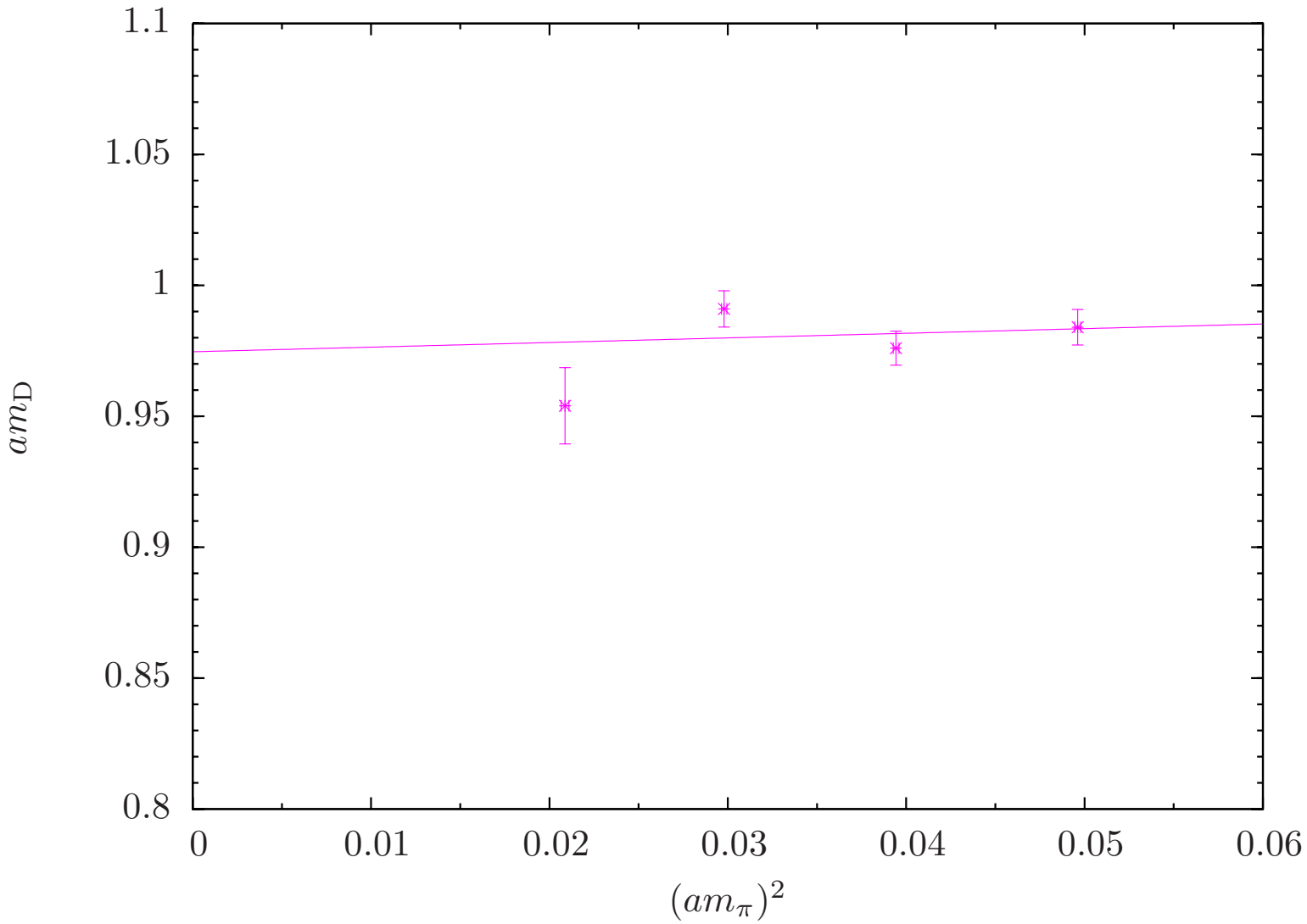
aμ	m_π	m_K	m_D
0.0040	0.144483(756)	0.263183(596)	0.9540(146)
0.0060	0.172613(445)	0.271337(1070)	0.9730(139)
0.0080	0.198583(413)	0.281827(570)	0.9760(65)
0.0100	0.222755(387)	0.292209(486)	0.9840(68)

- Using r_0=0.45 fm leads at the chiral limit
  $m_K \sim 530$ MeV
  $m_D \sim 2200$ MeV

m_K plot



m_D plot

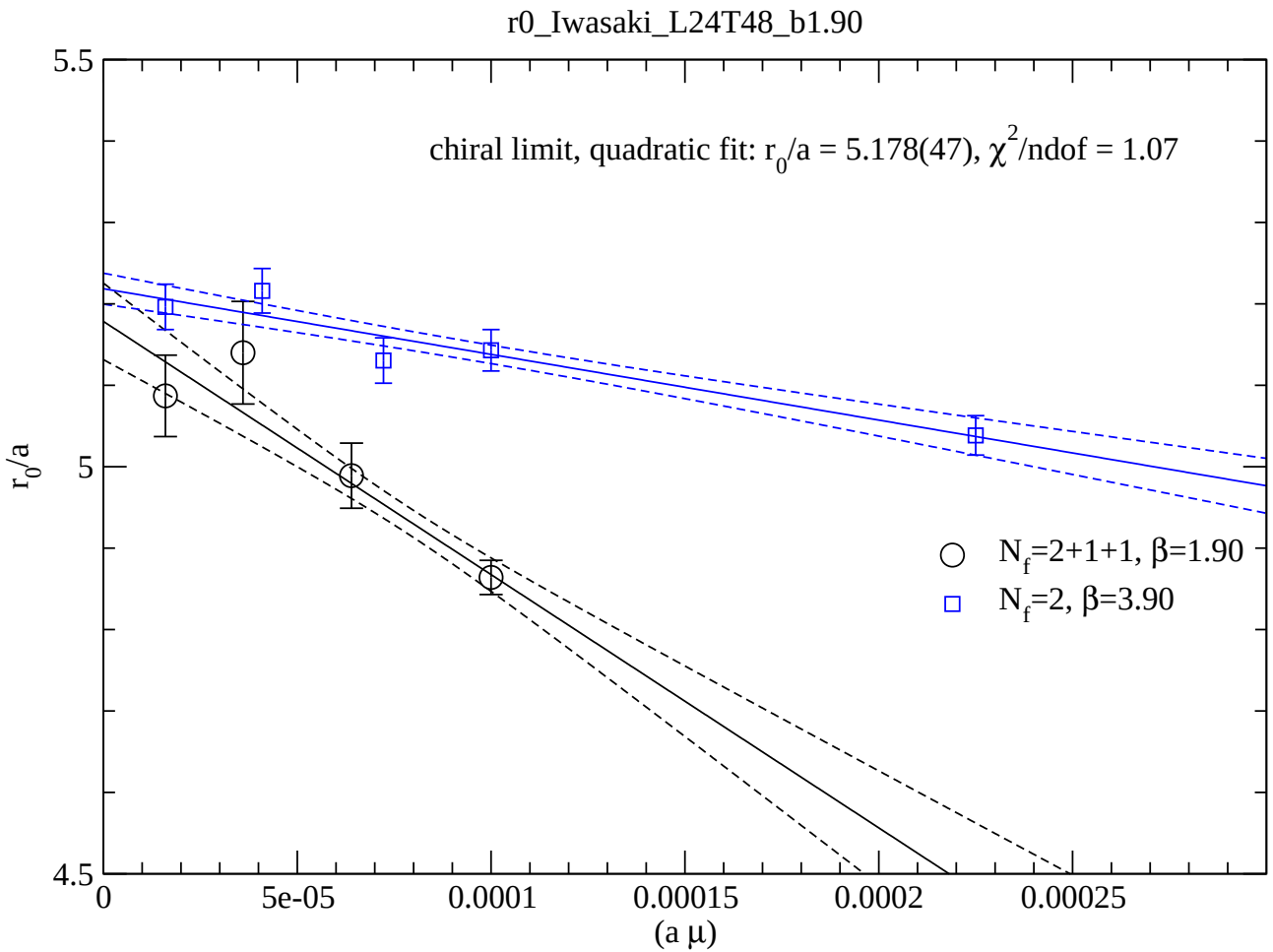


r_0 data

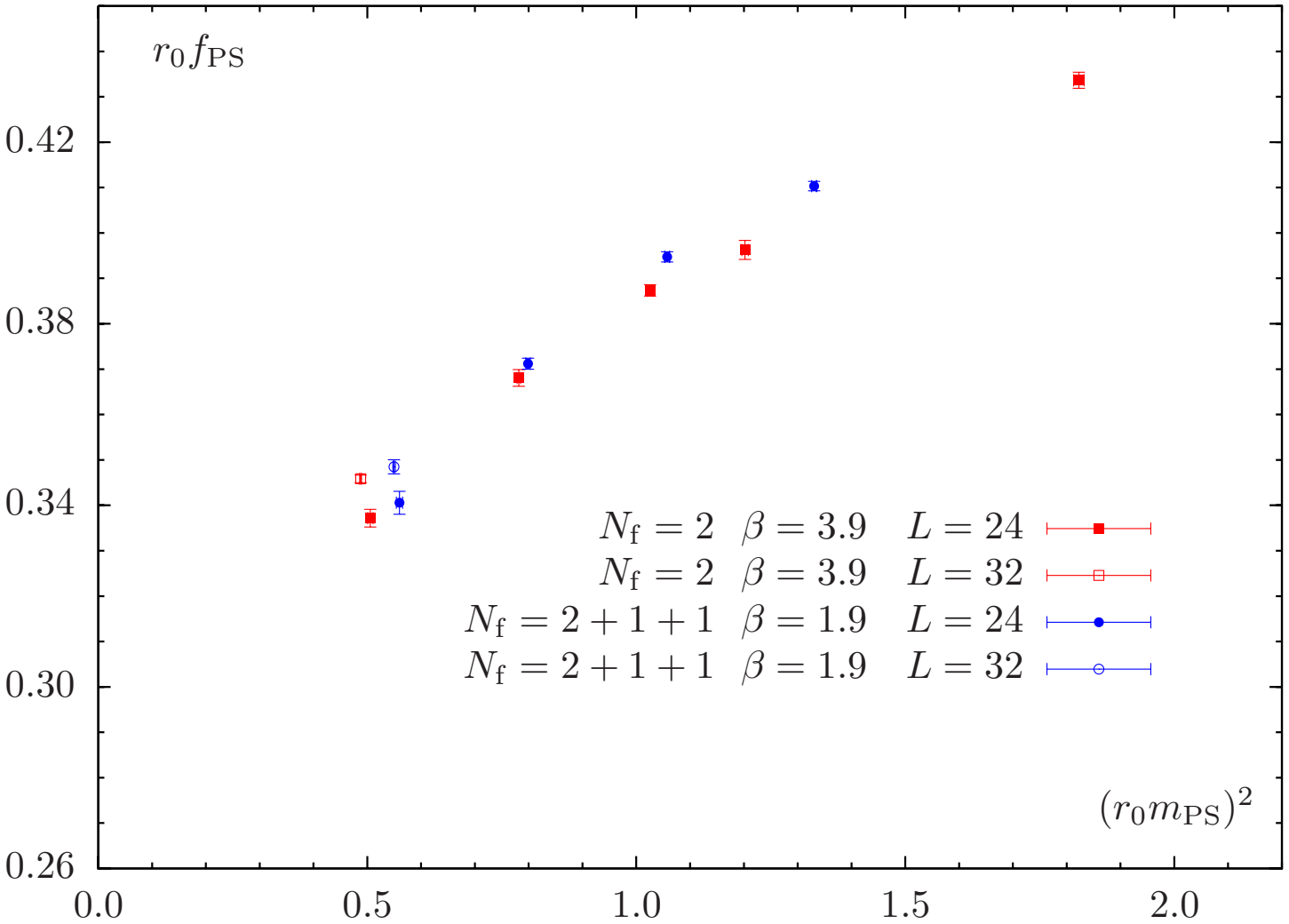
Latest data provided by Urs

a μ	r_0/a	err	nmeas	conf
0.0040	5.087	0.050	435	1000-2792
0.0060	5.140	0.063	223	0500-1394
0.0080	4.989	0.040	332	1896-3220
0.0100	4.864	0.021	424	1304-2996

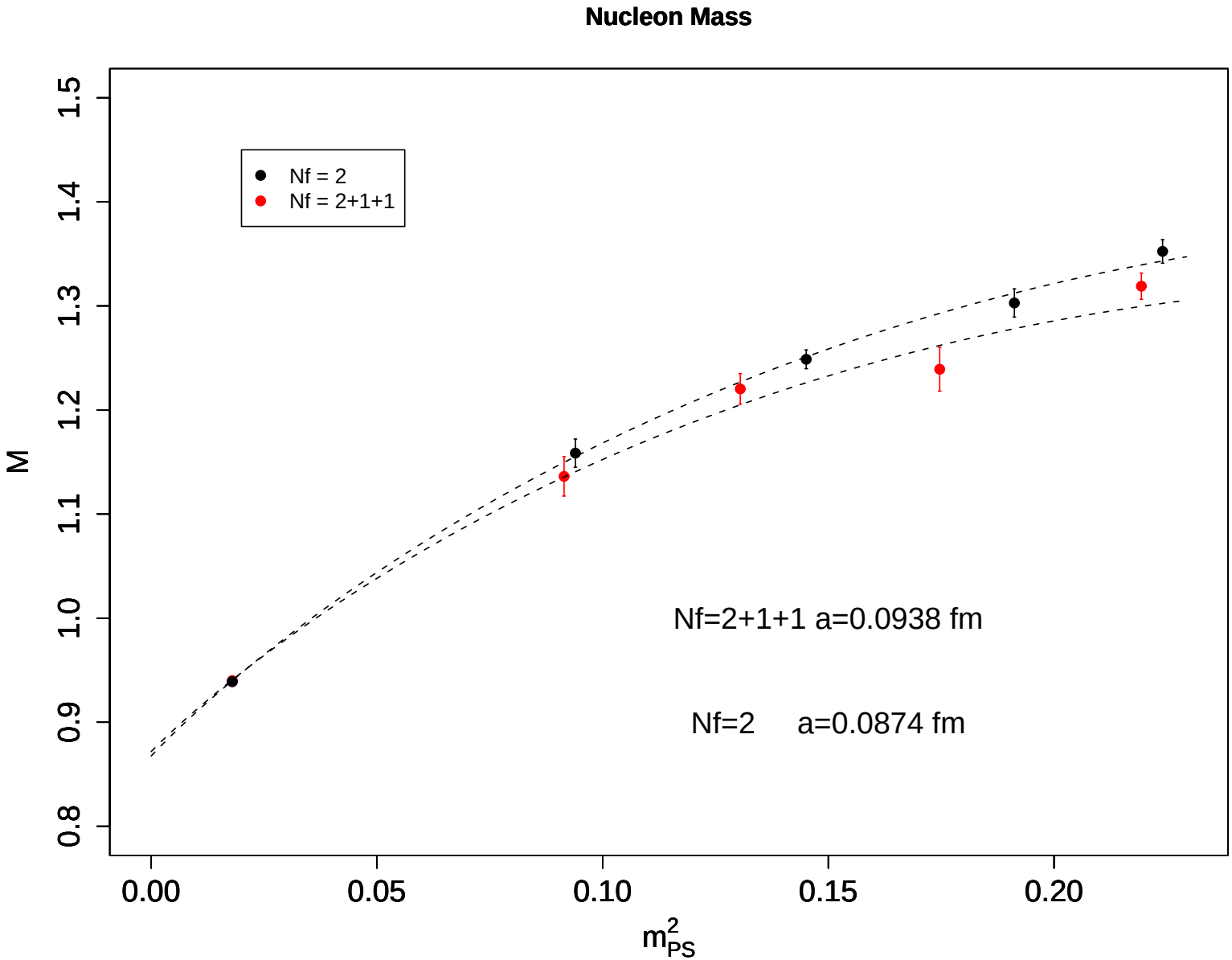
r_0 plot


r0_Iwasaki_L24T48_b1.90
chiral limit, quadratic fit: r0/a = 5.178(47), χ2/ndof = 1.07
Nf=2+1+1, β=1.90
Nf=2, β=3.90
r0/a
(a μ)
5.5
5
4.5
0
5e-05
0.0001
0.00015
0.0002
0.00025

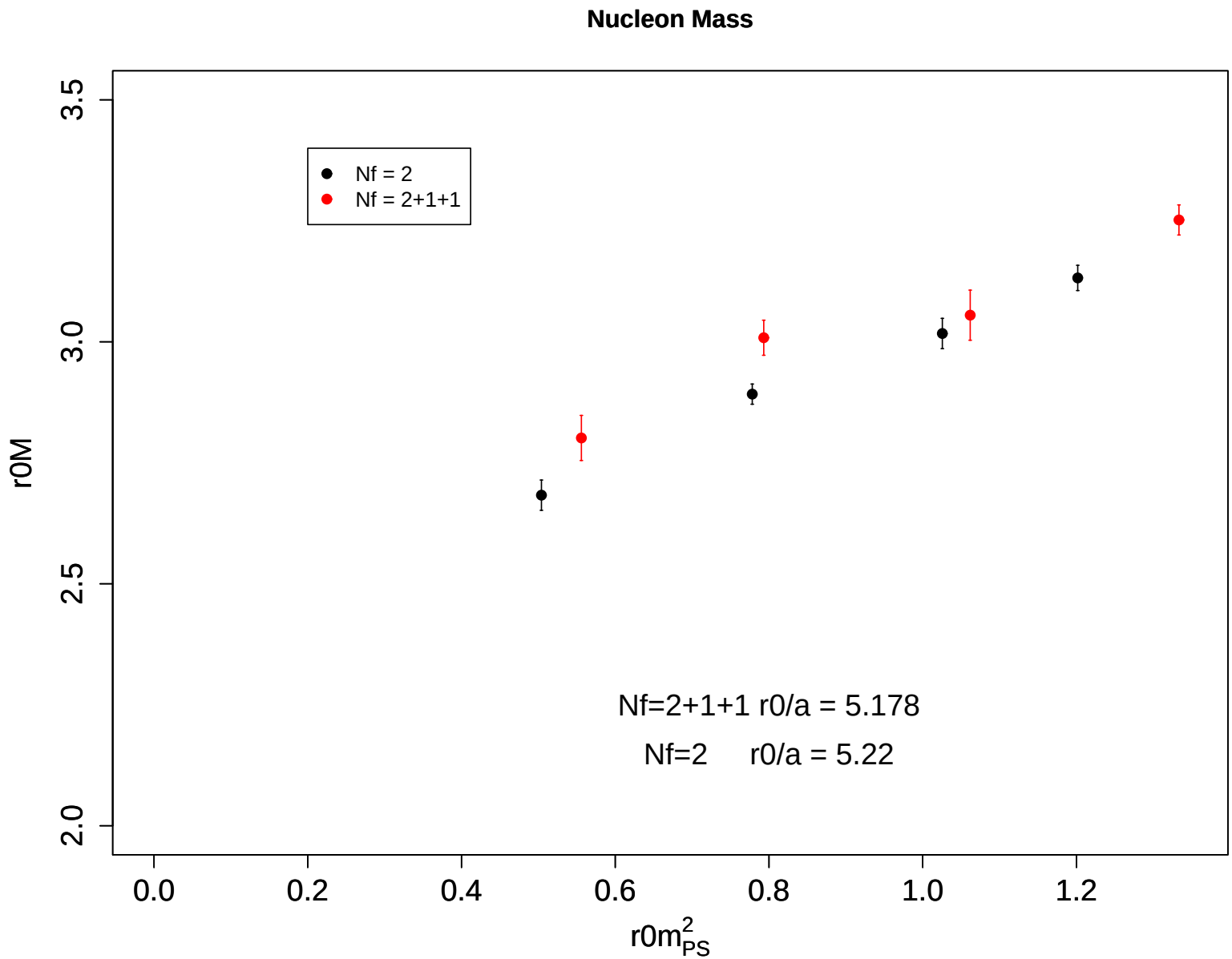
$r_0 f_{PS}$ summary plot



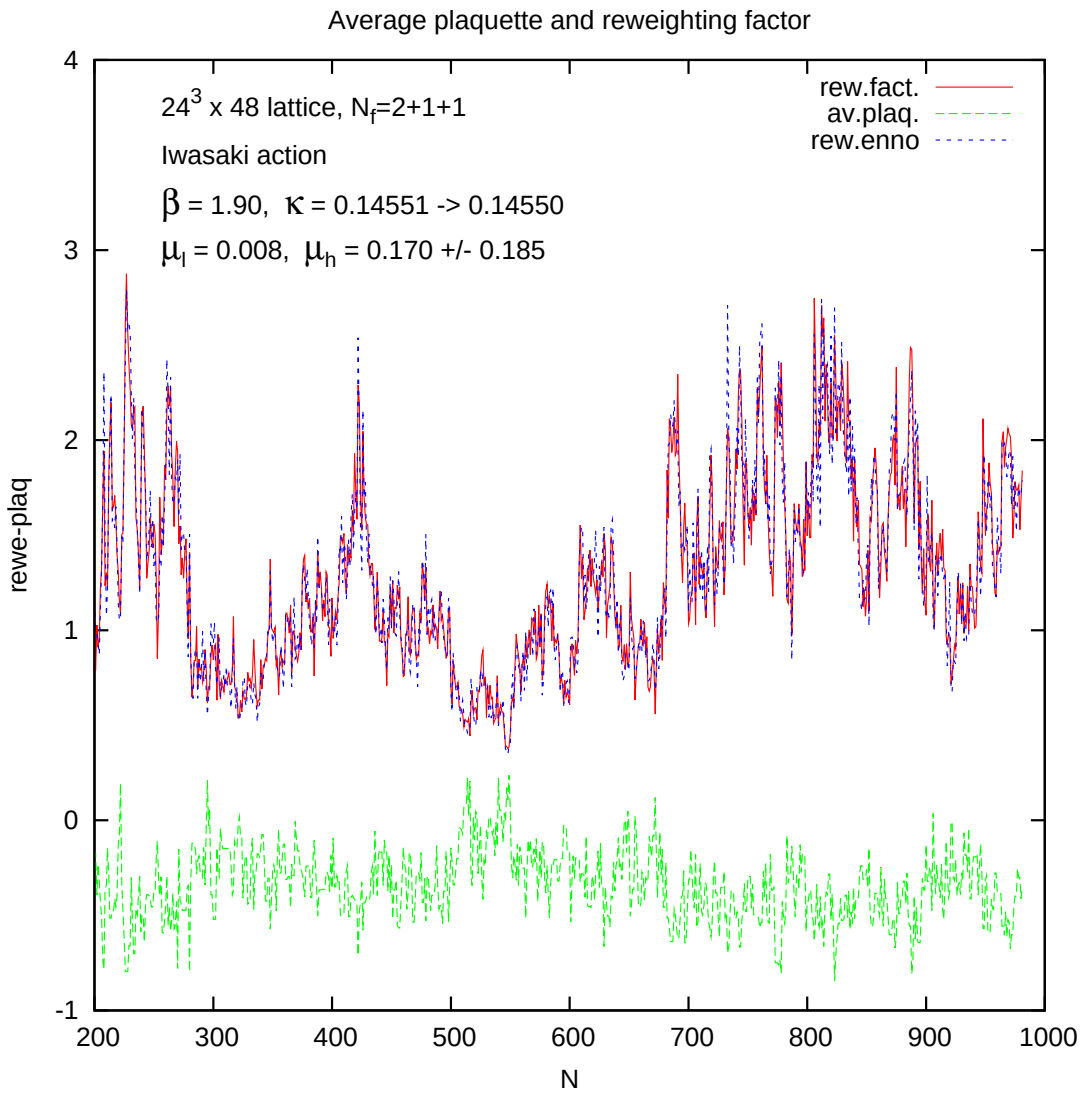
Nucleon I


Nucleon Mass
Nf = 2
Nf = 2+1+1
Nf=2+1+1 a=0.0938 fm
Nf=2 a=0.0874 fm
M
m_{PS}^2
0.8
0.9
1.0
1.1
1.2
1.3
1.4
1.5
0.00
0.05
0.10
0.15
0.20

Nucleon II


Nucleon Mass
Nf = 2
Nf = 2+1+1
Nf=2+1+1 r0/a = 5.178
Nf=2 r0/a = 5.22
r0M
r0m$^2_{PS}$
2.0
2.5
3.0
3.5
0.0
0.2
0.4
0.6
0.8
1.0
1.2

Reweigthing I



Reweigthing II

run	β	κ	$a\mu_l$	$a\mu_h$	N_{conf}	plaquette	$\tau_{plaq}^{traject}$	r_0/a
14550-8	1.90	0.14550	0.008	0.170 ± 0.185	100-493	0.556845(47)	12.0	
14550-rew	1.90	0.14550	0.008	0.170 ± 0.185	200-981	0.556896(37)	12.1	4.86(14)
14551-8	1.90	0.14551	0.008	0.170 ± 0.185	100-981	0.556955(40)	15.4	4.99(8)

run	t_1-t_2	am_π	am_K	am_D	am_χ^{PCAC}	$af_{\pi\chi}$
14550-8	17-22	0.1693(16)	0.2626(17)	0.95(16)	0.00156(44)	0.0038(11)
14550-rew	17-22	0.1723(10)	0.2650(12)	0.907(78)	0.00051(25)	0.00126(48)
14551-8	17-22	0.1704(10)	0.2630(12)	1.03(11)	0.00002(31)	0.00006(78)

Practical details

- All $\beta = 1.9$ $L = 24$ on the ILDG grid (not full statistics for $\mu = 0.004$)
- All propagators (light and heavy sector) have been stored
- Correlators can be provided as well
- Smeared propagators available