

Physics plans and ILDG usage in Italy

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There are quite a lot of LQCD research activities in Italy ...

- ✓ ... a few of which *outside ILDG core-business* (e.g. finite temperature, confinement, topology ...)
- ✓ The italian branch of **CLS** is based in **Milano Bicocca**, **Roma1** and **Roma2**. At some point CLS will enter ILDG (see Stefan's talk, I suppose)
- ✓ Main ILDG users/consumers are still the **Rome ETMC groups @RM123**. A few snapshots from their works/plans, as directly connected to ILDG. They have been running tuning simulations ...



PROCEEDINGS
OF SCIENCE

A first look at maximally twisted mass lattice QCD calculations at the physical point

A. Abdel-Rehim^(a), Ph. Boucaud^(b), N. Carrasco^(c), A. Deuzeman^(d),
P. Dimopoulos^(e,f), R. Frezzotti^(e), G. Herdoiza^(g), K. Jansen^(h), B. Kostrzewa^(i,h),
M. Mangin-Brinet^(j), I. Montvay^(k), D. Palao^(l), G.C. Rossi^(e), F. Sanfilippo^(b),
L. Scorzato^(m), A. Shindler⁽ⁿ⁾, C. Urbach^(a), U. Wenger^(d)

4. The Path to $N_f = 2 + 1 + 1$

Simulations with $N_f = 2 + 1 + 1$ flavours of dynamical quarks at the physical point are clearly the eventual goal, for which the present contribution is an important proof of principle. There are

- ✓ A strategy to tune parameters (quark masses, c_{SW})
- ✓ Main ingredients: Iwasaki gauge + **clover improv.** on "maximally twisted" fermions
- ✓ Small mass splitting for (neutral and charged) pions already for lattice spacing of order 0.1 fm



PROCEEDINGS
OF SCIENCE

HU-EP-14/53, SFB/PPP-14-91, DESY 14-218

Progress in Simulations with Twisted Mass Fermions at the Physical Point

A. Abdel-Rehim^(a), C. Alexandrou^(a,b), P. Dimopoulos^(c,d), R. Frezzotti^(c),
K. Jansen^(e), C. Kallidonis^(a), B. Kostrzewa^(f,g), M. Mangin-Brinet^(g), G.C. Rossi^(c,d),
C. Urbach^(h), U. Wenger⁽ⁱ⁾

- ✓ This achievement for pions was proved successful
- ✓ The tuning work so has been going on for a while
- ✓ ... and they are now technically ready for

✓ 2+1+1 simulations on $L/a=T/2a=48$ @ $a \approx 1\text{fm}$ and
pion mass around 135 MeV

- ✓ ... This could result in O(200) new configurations to be put on ILDG

An important technical issue!

In the framework of an H2020 proposal for a **Centre of Excellence** in scientific computing, there is the proposal for an action (WG) dedicated to **Data Management for LQCD**. **CINECA** is one of the players and we expect that this would boost our ILDG capabilities.

Computing facilities: Fermi still there ... not alone



- A BlueGene/Q system has been running at CINECA (Bologna) since 2012. CINECA is the major computing consortium in Italy (a TIER-0 site within PRACE!)
- Within the INFN-CINECA agreement now a new system is running:

GALILEO.

System Architecture

Model: IBM NeXtScale
Architecture: Linux Infiniband Cluster
Nodes: 516
Processors: 8-cores Intel Haswell 2.40 GHz (2 per node)
Cores: 16 cores/node, 8256 cores in total
Accelerators: 2 Intel Phi 7120p per node on 384 nodes (768 in total)
RAM: 128 GB/node, 8 GB/core
Internal Network: Infiniband with 4x QDR switches
Disk Space: 2,500 TB of local storage
Peak Performance: xxx TFlop/s (to be defined)



These actions are partly taken within the SUMA initiative