Something I learned from Pino ...

Roberto Frezzotti

University and INFN of Roma – Tor Vergata

Pino2012 – Cortona, May 29, 2012

Something I learned from Pino ...

... six years ('99–'05) in Milano (Bicocca)

As a lattice field theory (LFT) practitioner, at that time

working on improved fermionic discretizations

and involved in Monte Carlo computations of hadronic parameters and weak matrix elements

I was viewing LFT essentially as an *ab initio* method for

precision computing

Pino appreciated it ... but he thought me that LFT,

with its non-perturbative techniques, can lead to a

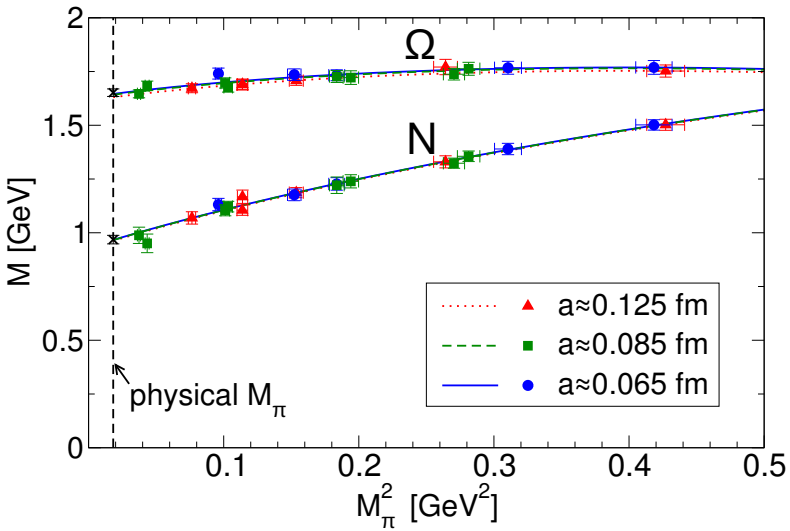
deeper understanding

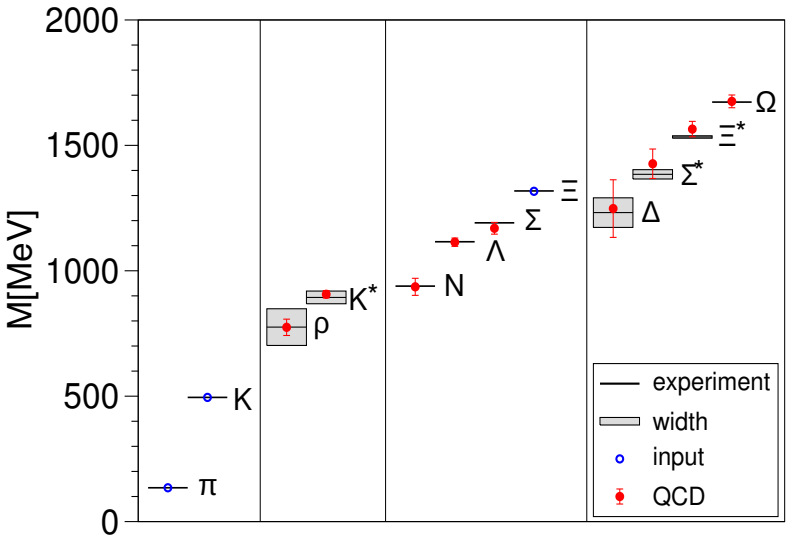
of strongly interacting quantum field theories.

Well... it is not trivial to achieve this kind of results

(and in Milano I failed to make progress in that direction)

A classical example is the hadron spectrum: lattice QCD (LQCD) has provided a clear numerical demonstration of scale invariance breaking due to non-perturbative QCD dynamics [WMB Coll. '09]

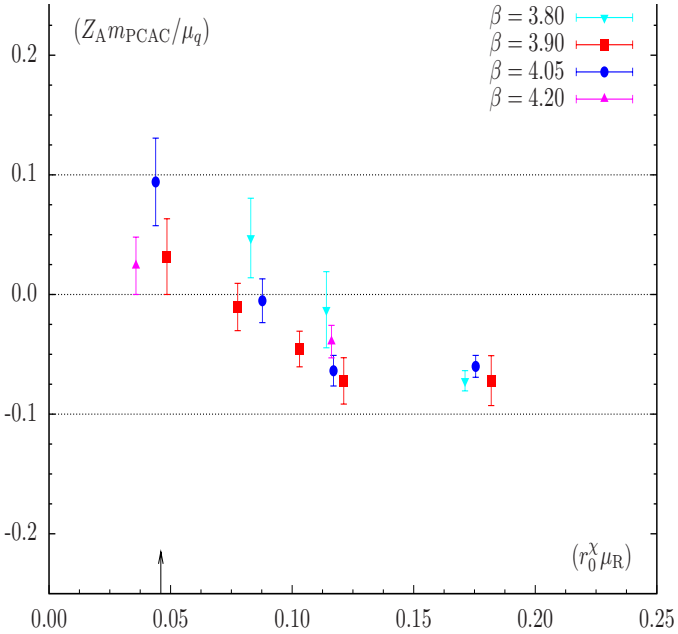




starting from $L = \frac{1}{2}\mathrm{tr}[F \cdot F] + \sum_{f=u,d,s} \bar{q}_f(\gamma_\mu D_\mu + m_f)q_f$

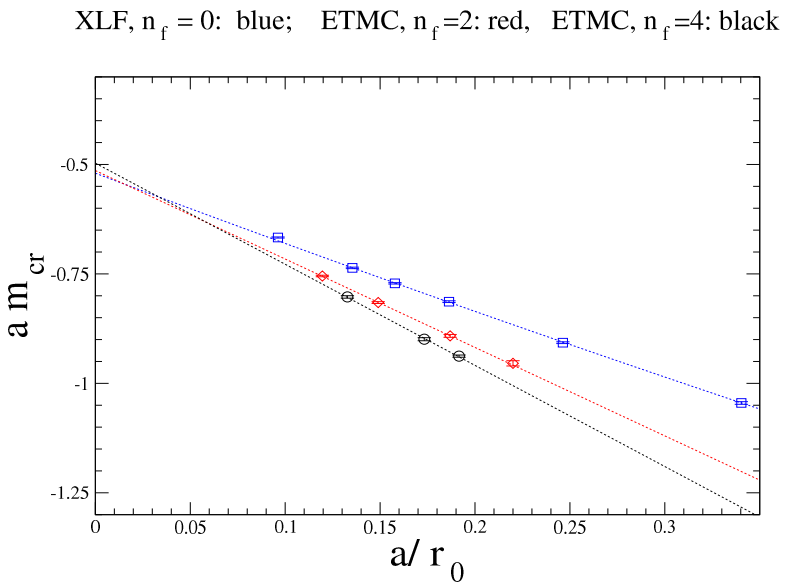
Moreover $\Sigma = -\frac{1}{2}\langle \bar{u}u + \bar{d}d \rangle$ is found non-zero and ~ 300 MeV

A further minor example ...



ETM Coll. '09

from my little experience



G.C. Rossi talk today

The same set of data can be read/used quite differently ...

- to determine the m_0-value at which $m_{\rm PCAC}$ vanishes at small μ_R (the parameter controlling the quark mass in twisted mass LQCD)
- to study $am_{\rm cr} = c_0 + c_1 \frac{a}{r_0} + \ldots$: is $\frac{|c_1|}{r_0}$ a N.P.ly generated mass?

I ignore whether the attempt (by G.C. Rossi and myself) to get from non-perturbative LFT new insights on the elementary particle mass problem will be successful

but

I am sure that the orientation of research work towards a deeper and deeper understanding of matters, which Pino constantly thought to many young people, will be highly beneficial for the future of theoretical and particle physics.

HAPPY BIRTHDAY PINO