

WP2- TORIC Theory of Relativistic heavy Ion Collisions

Theory network of

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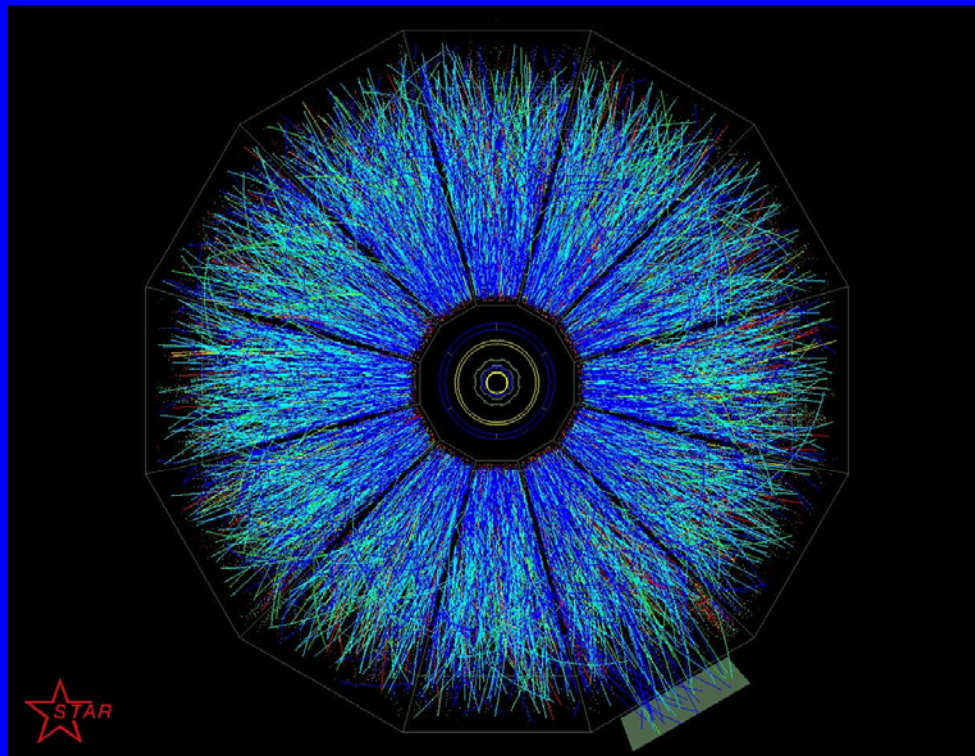
6 new laboratories

200 Researchers implied

12 IR Collaboration Committee

Budget: 100 KEuro Travel 3,5 post doc years

In a typical heavy ion collisions a couple of hundred particles are produced



Heavy ion collision seen by the
STAR detector

The goal of the experiment is not (only) to measure the properties of all particles (this is already difficult enough)

but to find out how matter behaves at high density and temperature

It is the challenge for the theory to infer from the data the properties of matter at high density and temperature

This challenge is all but easy to meet because the system is rapidly expanding -> no static approaches possible
not in equilibrium -> transport theory
contains all momentum scales -> pQCD not sufficient
passes fast through a phase transition

Therefore experts from different fields have to work together
and
therefore we have asked to support this network

On some question agreement has been obtained:

- hadrons containing u,d,s quarks are produced at the phase transition -> spectra do not contain info's on the high density plasma phase (only on T_c and μ)
- impact parameter dependence understood
- collective variables (v_2) reproduced by hydrodyn. calculations but physical interpretation difficult
- c and b quarks do not come to equilibrium with the plasma
-> hadrons with c or b may carry info's on the interior of the plasma
- γ and leptons may also test the interior but info difficult to obtain

But there are key problems which wait for an answer:

- why equilibrium is established 1 fm/c after the nuclei touch each other (as suggested by hydro calculations)?
- how quarks combine to hadrons at the phase transition?
- what are the hadron properties close to the phase transition?
- how do heavy quarks interact with the plasma: collisional and radiative interactions ?
- do heavy mesons like J/ψ disintegrate in the plasma?
- what is the physics of the observed scaling laws?

THESE QUESTION WILL BE ATTACHED BY TORIC

I3-HP Collaboration Committee
Meeting, september, 2009

Original plan (start 1.1.09):

2 workshop (january 10, july 1	50 KE
travel	50 KE
3 ½ postdoc years	140 KE
indirect costs, administ	15 KE

Money has not arrived yet.
(our accounting office tell me it will be available in Sept.)

Therefore no activity (besides many emails) has started yet

Even if the money arrives, it will take time until the activities start (invitations, postdocs etc)

Workshop planned for dec 09 will not take place

Therefore we should discuss the reporting 09.

If the I3 runs until mid 2011 only we may have problems with post docs contracts (postdocs are hired typically in sept/oct)

We hope that the network runs longer:

Probable solutions

workshops -> sept 10, end 11/beginning 12

postdocs start from 9/2010 (may be some earlier)