Closing Remarks & Outlook

Next steps in the Energy Frontier - Hadron Colliders

25-28th Aug 2014, FNAL, Chicago

Chairs:

Sanjay Padhi (UC San Diego)

Richard Cavanaugh ((UIC)

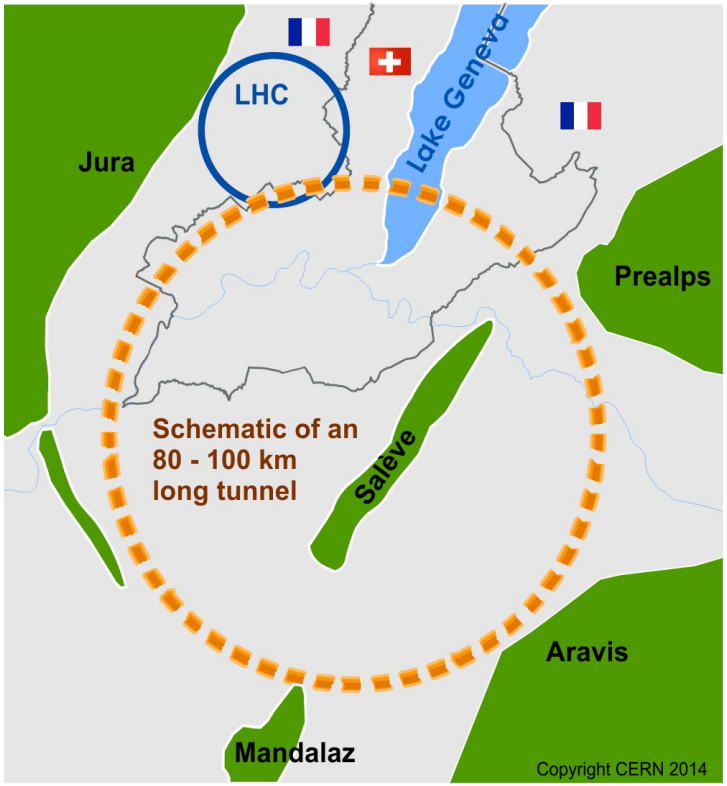
Boaz Klima (Fermilab, LPC co-coordinator)

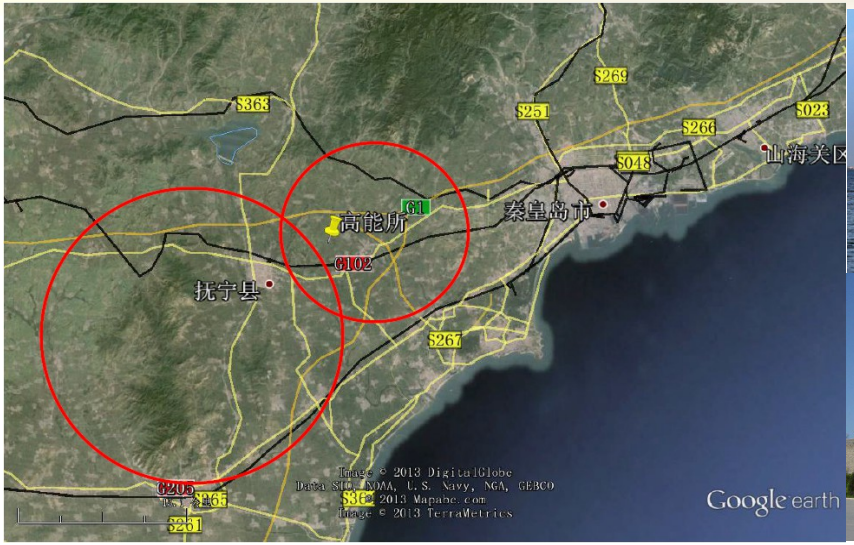
Meenakshi Narain (Brown University, LPC co-coordinator)

Next Steps in the Energy Frontier – Hadron Colliders

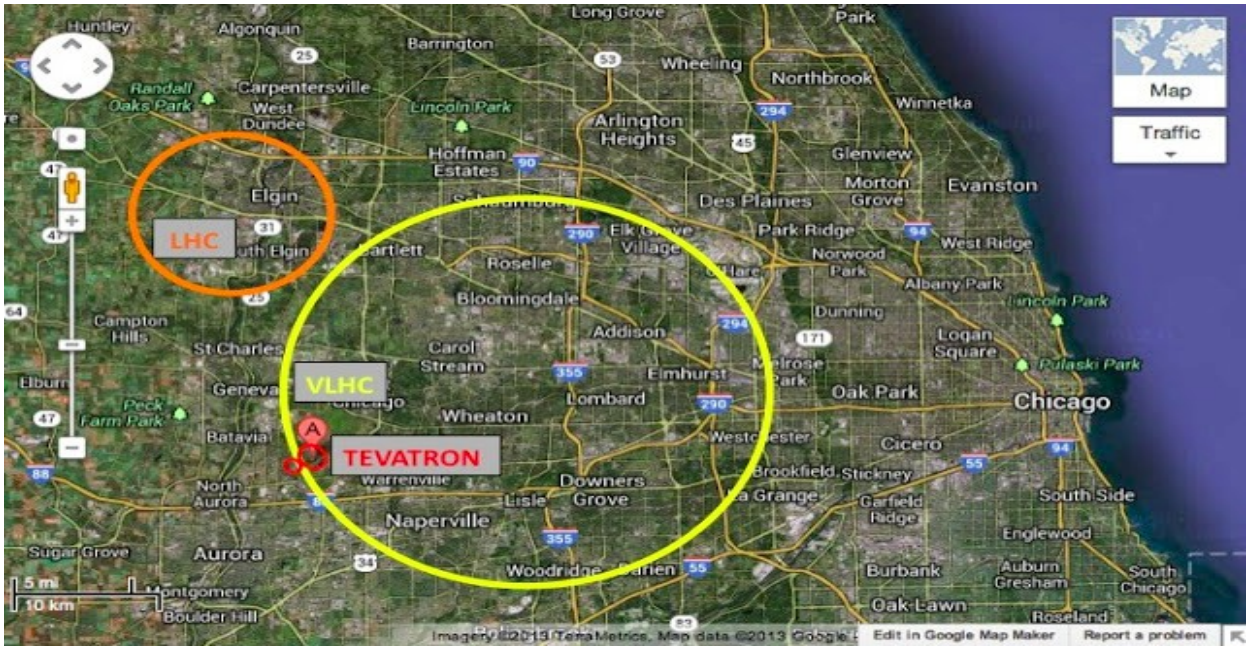
FCC

- Future CERN Collider?
- Future China Collider?
- Future Chicago Collider?





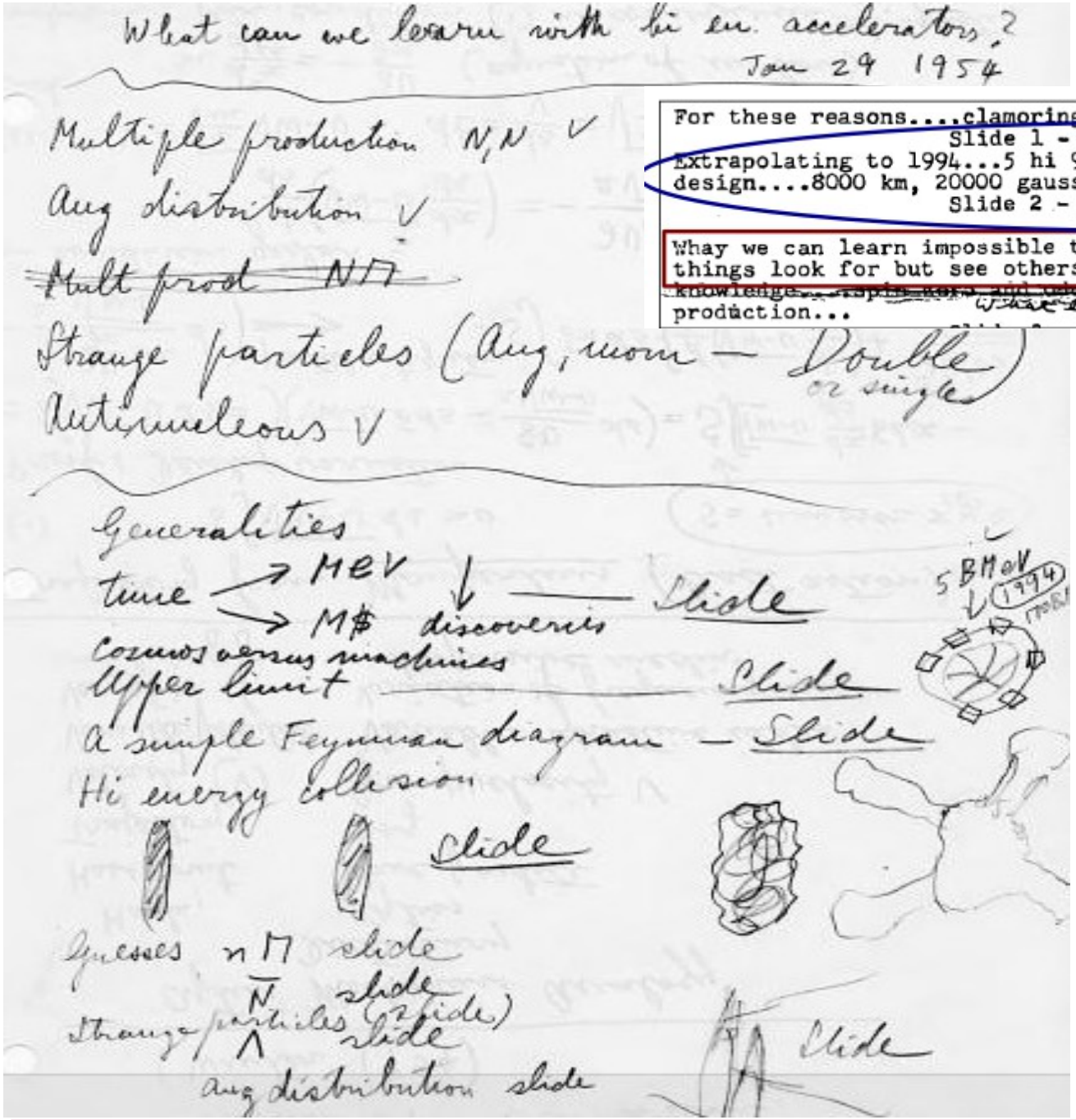
C. M. Bhat et. al arXiv:1306.2369



Irrespective of where this will be built,

We need Accelerator, Detector & Physics studies → Lifeblood of our field

Enrico Fermi - American Physical Society, NY, Jan. 29th 1954



For these reasons....clamoring for higher and higher....
Slide 1 - MeV - M$ versus time.
Extrapolating to 1994...5 hi 9 Mev or hiest cosmic...170 B$....preliminary design....8000 km, 20000 gauss
Slide 2 - 5 hi 15 eV machine.

Whay we can learn impossible to guess....main element surprise....some things look for but see others.....Experiems on pions....sharpening knowlenge...[illegible]...certainly look for multiple production...

Fermi's extrapolation to year 1994:
2 T magnets, R=8000 km (fixed target !),
E_{beam} ~ 5×10^3 TeV → $\sqrt{s}$ ~ 3 TeV
Cost : 170 B$

Was that hopeless ??

F. Gianotti - LHCP2014

We have found the solution:
we have invented colliders
and superconducting magnets ...
and built the Tevatron and the LHC

Requirements for a 100 TeV proton collider

The discovery potential of a future ~100 TeV proton collider will depend on:

→ Instrumentation Challenges, Accelerator Challenges, Machine detector req.

→ Muon detection at several 10s of TeV range, Large Magnetic Fields

→ Calorimeters capable of measuring jets close to 50 TeV

and at the same time able to resolve sub-jets efficiently

→ Forward detectors in high radiation environments etc.

Strong International Collaboration is the Key

→ Collaborate with Accelerator, instrumentation frontier for best technologies

→ Evolve the current simulation/tools to accommodate such changes

→ Physics studies/"gains" using the best available knowledge and tools

→ Cost effectiveness

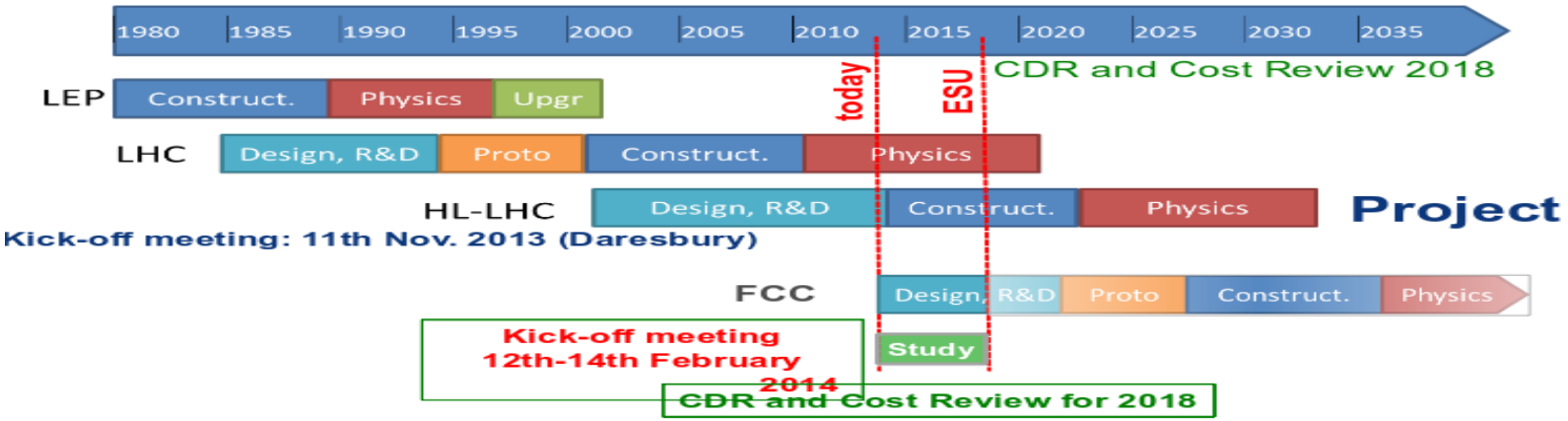
The results of these will be extremely beneficial to the community at large

- We need to get engaged

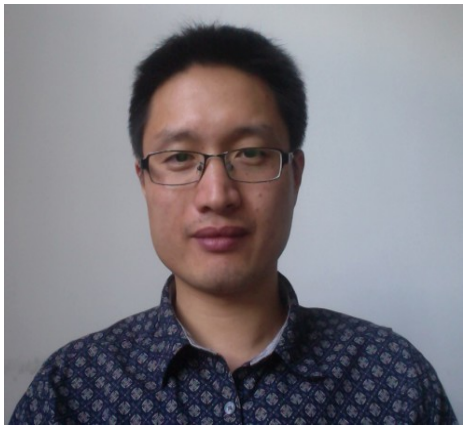
Collaborative Opportunities

Daniel Schulte

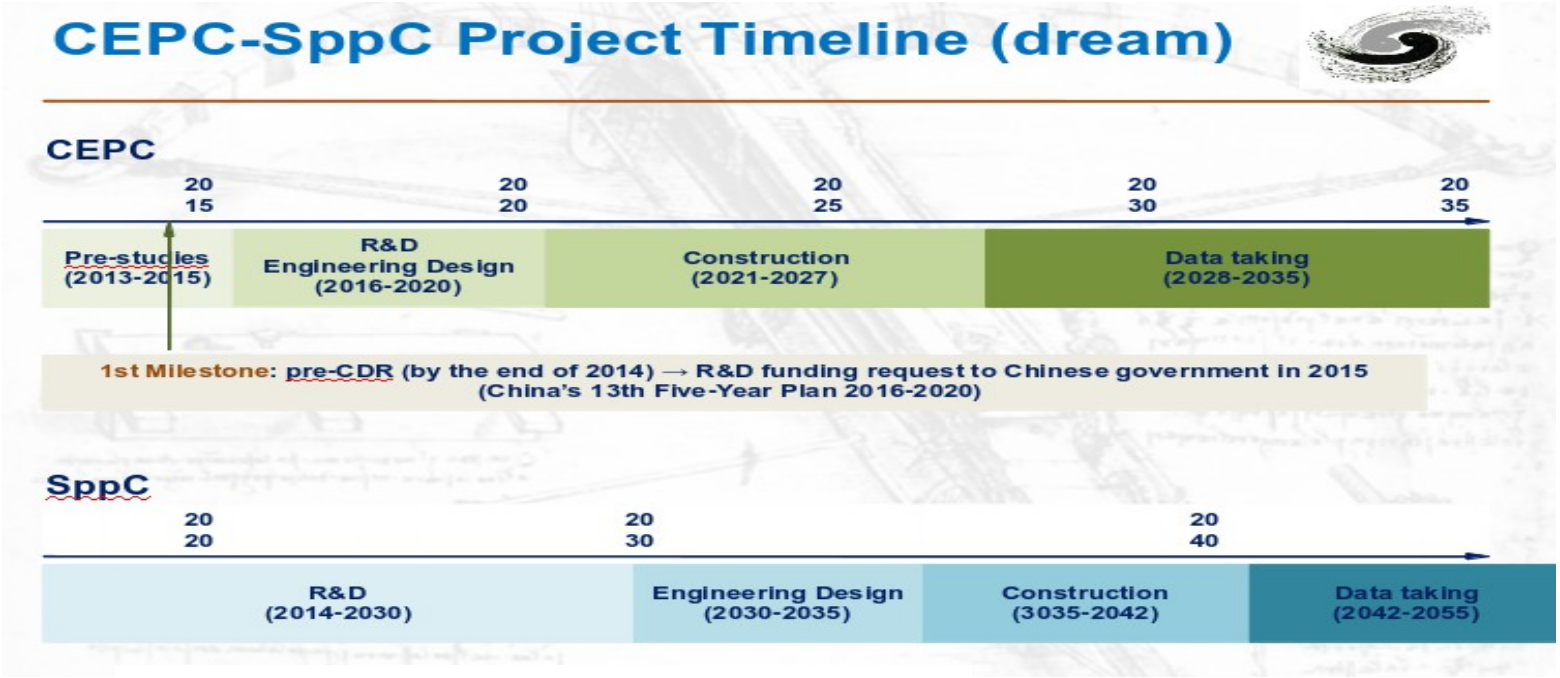
FCC study milestones



Hongbo Zhu



CEPC-SppC Project Timeline (dream)

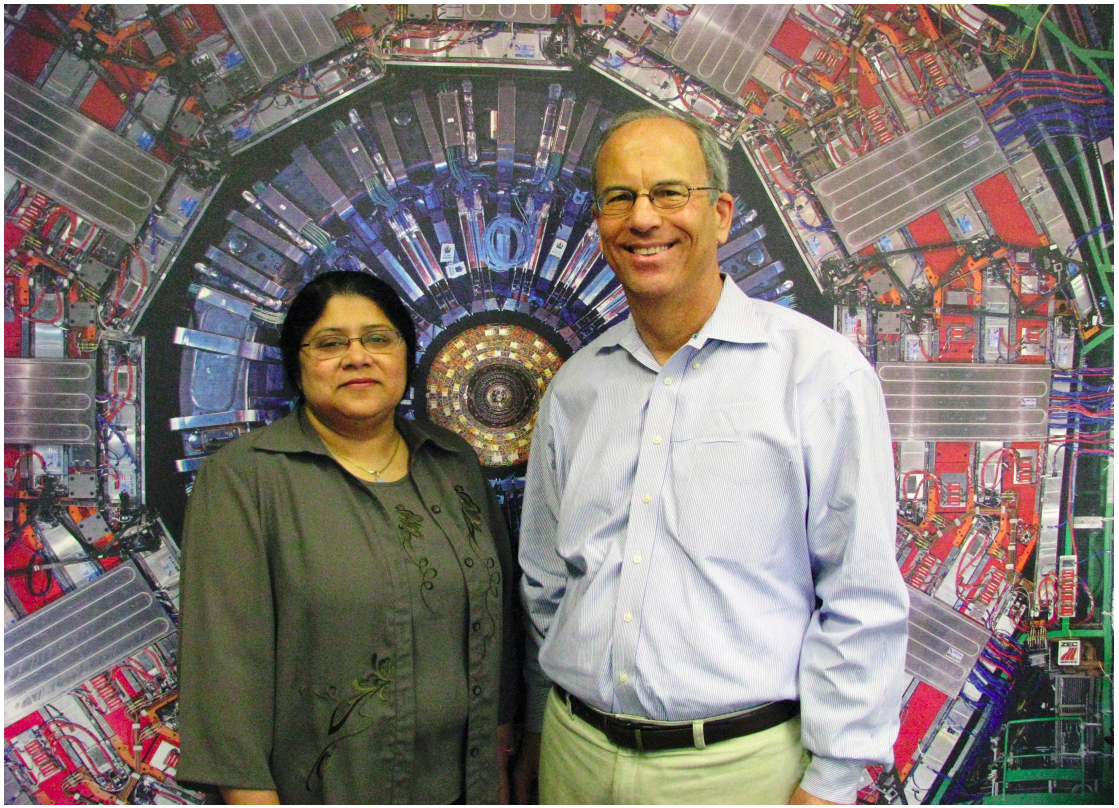


Reviving the VLHC - http://vlhc.org/vlhc/

Acknowledgement

LPC LHC PHYSICS CENTER

Fermilab



Thank you very much to the LPC for hosting this meeting!

→ We should continue our collaboration & dialogue

Thanks also for your support - co-organizers of this workshop

Thanks to FNAL Workshop/Conference team and ...

"We (I) have a Dream"

- Synergy between various global efforts are essential.
- LPC welcomes you ~~this week to join us in our~~ continued dialogue to bring together various initiatives on how to advance the energy frontier, with emphasis on hadron colliders.
  - Many thanks to all of you for joining us from near and far !(especially during the prime vacation month!

You are always invited

- ~~We invite you~~ to visit the LPC (10^{th}, 11^{th} floors) for lively discussions with the best cup of coffee in town!
- The path to a next generation hadron collider is long
  - *Let's make it technically achievable*
  - *Let's keep our passion for science*
  - *Let's follow our dreams!*

These are exciting times,

→ let us keep the momentum going …

Thanks to all of you for your participation, the constructive discussions and the extremely positive and enthusiastic atmosphere that you brought to this meeting.