

LIA on CDF

Kihyeon Cho & Aurore Savoy- Navarro
(KISTI & IN2P3)

Presentation to the LIA Steering Committee
by EVO connection from Fermilab,
Monday July 21st , 2008.

Fermilab

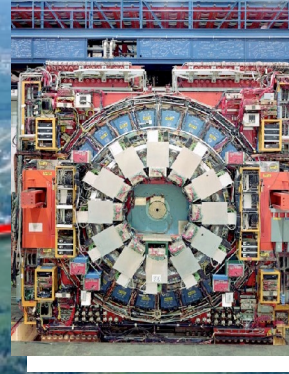
Fermilab CDF



20 miles west of Chicago, USA



Fermilab



Fermilab



Current (2008.7) World highest energy
(1TeV X 1TeV)

Energy Frontier: CDF, D0

Search for New Physics (Higgs,
SUSY, B Physics beyond standard
model effects,...

Precision Frontier:

b, charm, kaon, neutrino physics
(FOCUS, KTeV, NUMI/MINOS, BOONE,...etc.

Connection to Cosmology:

Sloan Digital sky survey, Pierre Auger,...

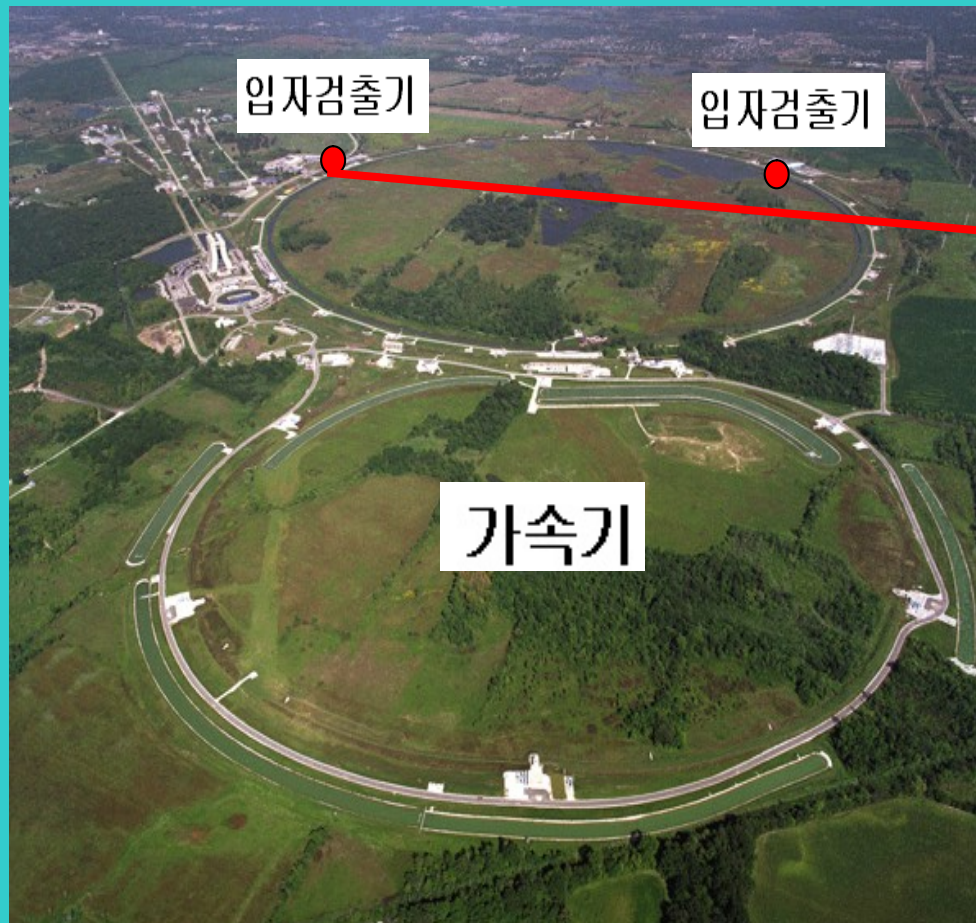
Largest HEP Laboratory in USA

2200 employees

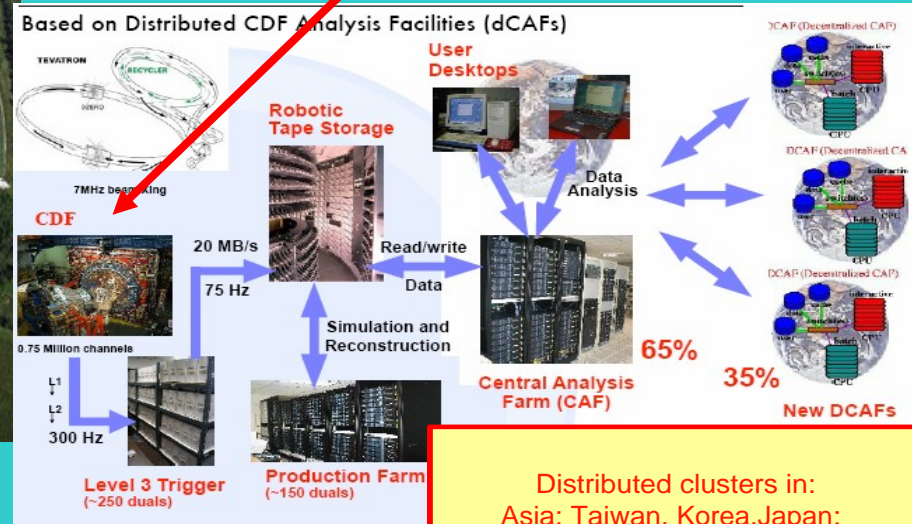
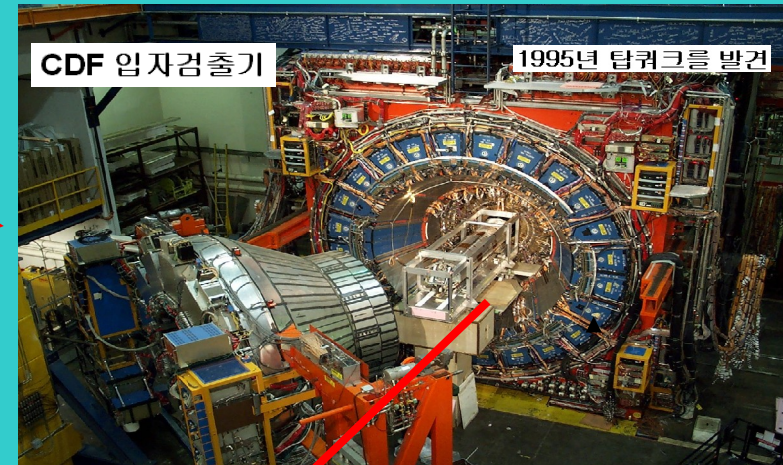
2300 users (researchers from Universities)

Budget is >\$300 million

CDF Experiment @ Fermilab

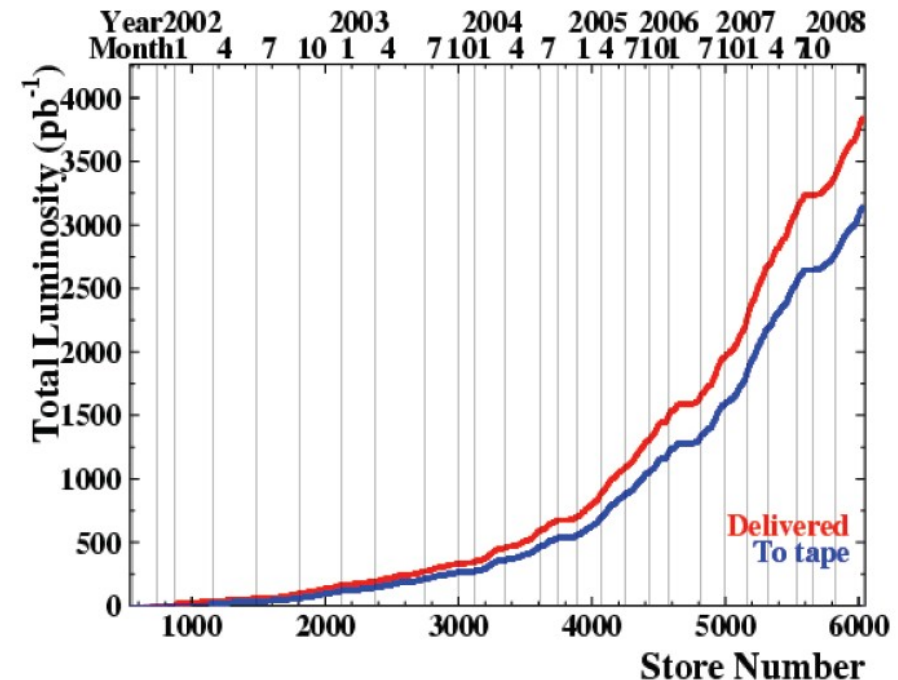
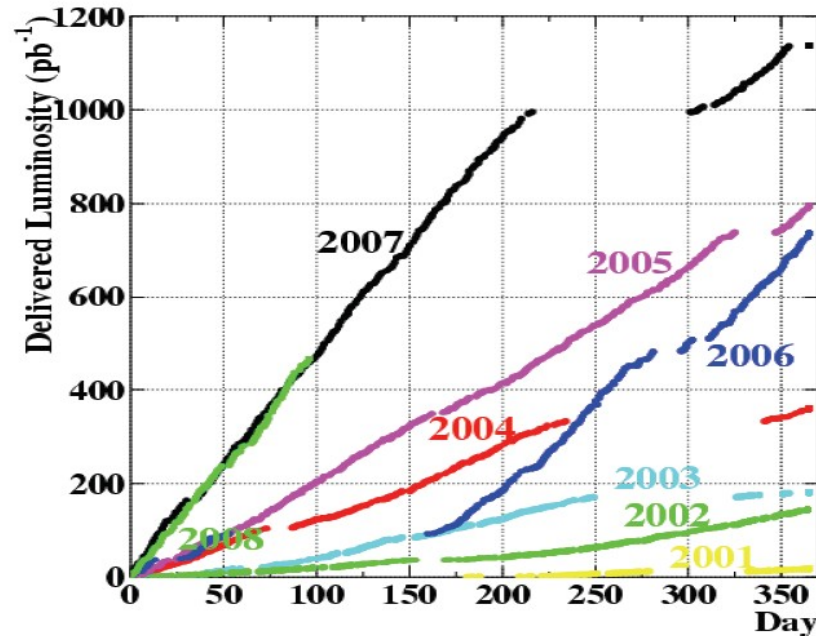


Fermilab machine complex at USA



Distributed clusters in:
 Asia: Taiwan, Korea, Japan;
 Europe: France, Germany, Italy,
 Spain, UK
 USA and Canada

Accelerator & CDF performance



- Tevatron is the world highest energy accelerator at $\sqrt{S}=1.96$ TeV.
- CDF will be able to take data until to 2010.
- Data processing and analysis will be done five more years after that.
- Data taken 3.2 fb^{-1}
- $5\sim 6 \text{ fb}^{-1}$ till by 2009

The CDF Collaboration

North America

◆ 34 institutions

The CDF Collaboration

- 15 Countries
- 62 institutions
- 635 authors
- Newly join: Univ of Athens (2007)
- Recently: Slovakia and Madrid (Spain) in 2006.

Europe

◆ 20 institutions

France group,

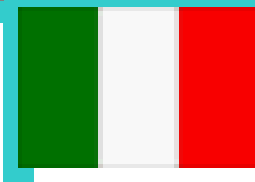
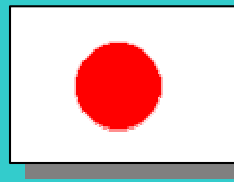
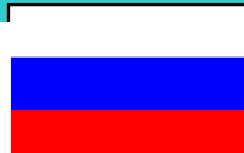
- LPNHE/ CNRS-IN2P3&UPMC and ParisVII Universities

Asia

◆ 8 institutions

Korea group,

- KISTI, Chonnam, KNU, SNU, SKKU



LIA on CDF

France



Aurore Savoy- Navarro
(LPNHE/IN2P3- CNRS)



Catalin Ciobanu
(LPNHE/IN2P3- CNRS)



Alisa Savelyeva
(PhD at LPNHE)

Nidal Esrhaidat (associated
to LPNHE)



Valeri Saveliev
(associated LPNHE)



Ph.D Student
(tba)

+ help CCIN2P3

Korea



Kihyeon Cho
(KISTI)



Hyunwoo Kim
(KISTI)



Minho Jeung
(KISTI)

DongHee Kim
(KNU)

Intae Yu
(SKKU)

Soo- Bong Kim (SNU)

Kyungkwang Joo (CNU)

Present CDF- France members

Name	Topic of research
Dr. Aurore Savoy-Navarro	Bs Physics Top/Higgs into τ lepton(s)
Dr. Catalin Ciobanu	Top/Higgs into τ lepton(s) Responsible of CDF GRID at CCIN2P3
Alisa Savelyeva (starting PhD student)	Bs Physics: Delta Gamma_s and sin2beta_s
Prof. Valeri Saveliev	Bs Physics
Prof. Nidal Esrhaidat	Top/Higgs into τ
PhD student (tba)	Top/Higgs into τ also involved in the CDF GRID running at CCIN2P3

The people mentioned here above will be participating to the LIA activities and we expect to have a co- advisor of thesis between our 2 teams.

Present CDF- Korea members

Name	Topics of research
Dr. Kihyeon Cho	Bs Physics, CDF Grid
Dr. Hyunwoo Kim	Bs Physics, CDF Grid
Minho Jeung	CDF system manager
Prof. DongHee Kim	Bs Physics, New physics Searches
Prof. Intae Yu	B Physics
Prof. Soo-Bong Kim	Single Top & Top dilepton decays
Prof. Kyung Kwang Joo	Top Physics

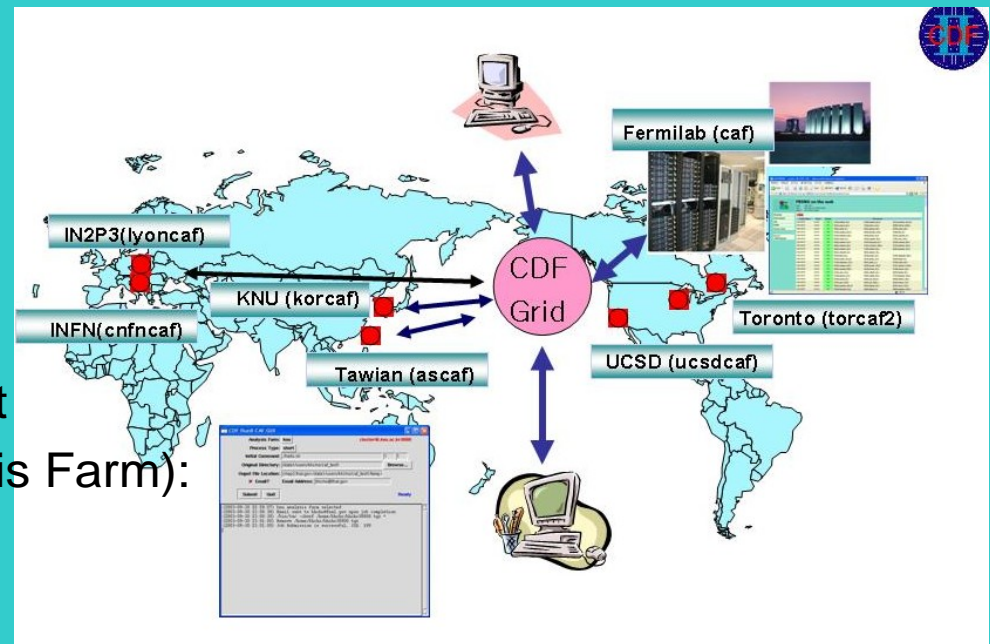
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LIA on CDF

High Tevatron luminosity => need for important computing means & triggered developing GRID at CDF

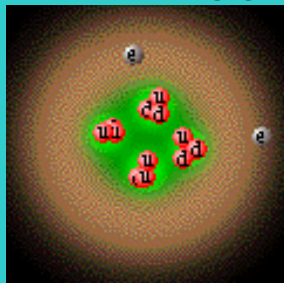
● CDF Grid

- ❑ CAF (Central Analysis Farm): Past
- ❑ DCAF (Decentralized CDF Analysis Farm): Current
- ❑ Grid CAF



Two important Physics topics at CDF:

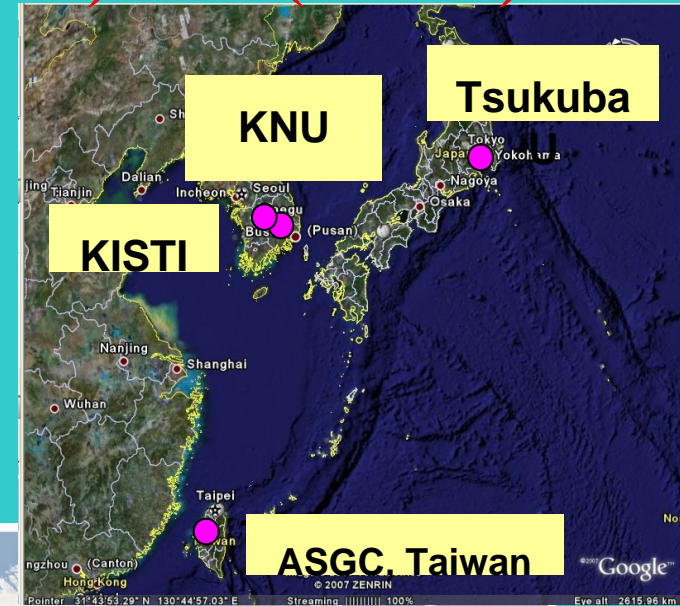
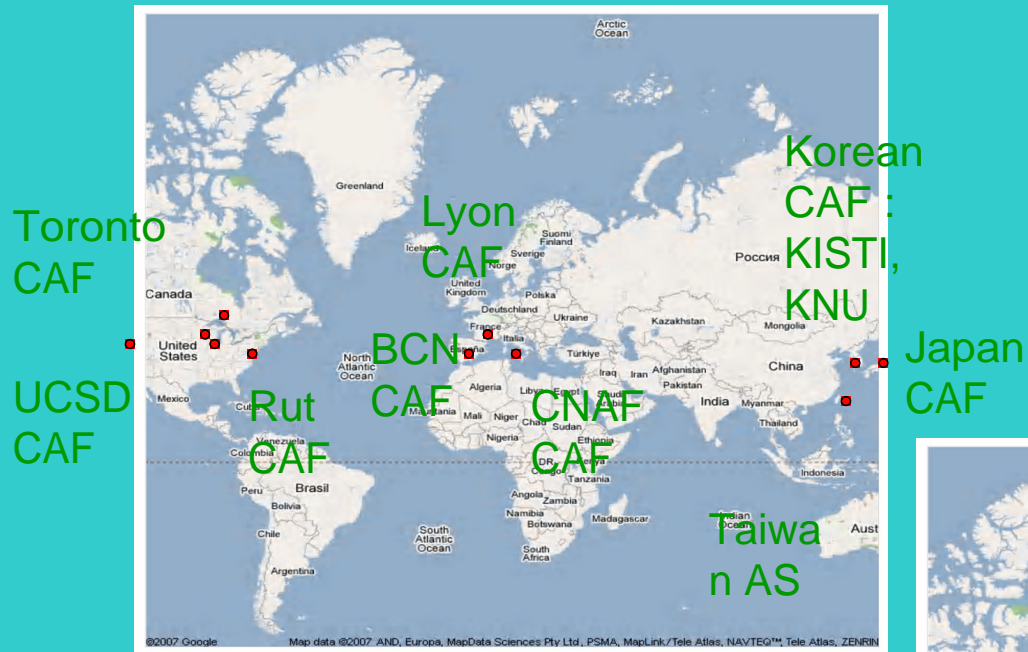
- Bs Physics
- Top & Higgs - > τ lepton(s)



Quarks	u up	c charm	t top
	d down	s strange	b bottom
Leptons	ν_e e- Neutrino	ν_μ μ - Neutrino	ν_τ τ - Neutrino
	e electron	μ muon	τ tau
I II III The Generations of Matter			

CDF Grid Farms around world

CAF → DCAF → Grid Farm → CGCC
(2001) (2003) (2006) (2008)



North America
CAF

European
CAF

Pacific CAF

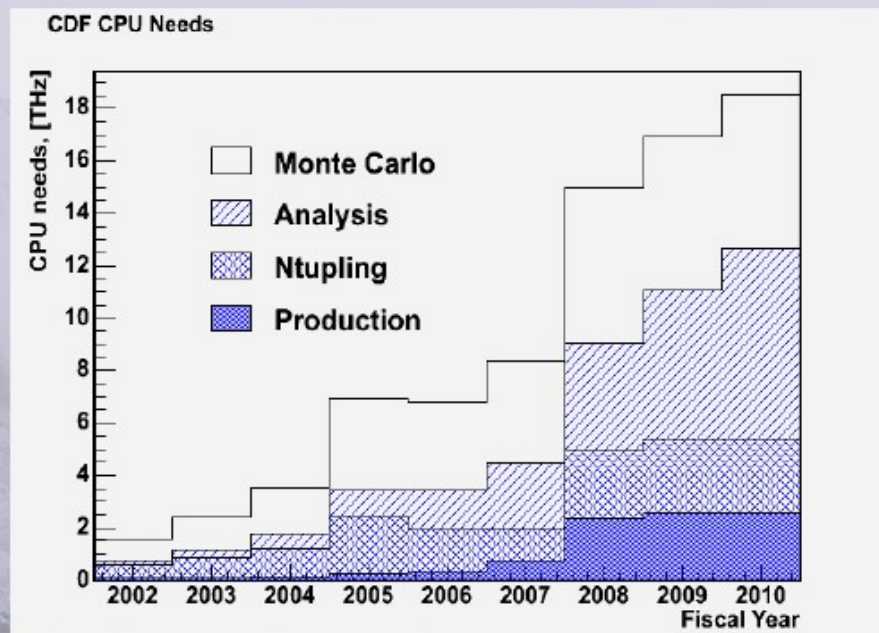


History of CDF Grid

Name	Start date	Grid middlewar e	Job scheduling	Content	Site
CAF	2001	-	Condor	Cluster farm inside FNAL	USA (Fermilab)
DCAF	2003	-	Condor	Cluster farm outside FNAL	Korea, Japan, Taiwan, Spain (Barcelona, Cantabria), USA (Rutgers, San Diego), Canada, France,
Grid CAF	2006	LCG / OSG	Resource Broker + Condor	Grid farm	North America CAF European CAF Pacific CAF
CGCC	2008 (plan)	LCG	Resource Broker + Condor	Big Grid farm	Korea (KISTI) France (IN2P3) Italy (CNAF)



The CDF has to exploit GRID



- Expected cpu needs in 2008
~ 6500 KSPI2K logging data rate
30 MB/s (CDF Comp. Model)
- On site (Fermilab) available
~ 5000 KSPI2K
- Missing resources have to be
found out sites, **GRID** \Rightarrow
CDF adapted to GRID

- Up to now resources have been exploited in opportunist way
- LHC is starting, CDF needs guarantee resources \Rightarrow CDF
Computing Centers have been proposed and created in countries
where there are big computing center and CDF representatives:
CNAF (Italy), Lyon (France), KISTI (Korea)



Fermi National Accelerator Laboratory
P.O. Box 500 • Batavia, Illinois • 60510

October 29th, 2007

Dr. Byung-tae Yang
President, KISTI

Dear Dr. Yang:

We would like to thank you for your visit to Fermilab and the CDF experiment and for your recent e-mail communication. It was a pleasure to meet with you along with Dr. Okhwan Byeon, and the other members of the visiting committee. We hope that we were able to convey the importance and dynamism of our activities and our desire to establish a close and fruitful collaboration between Fermilab and KISTI.

To that purpose, we would like to suggest further discussion with the following three goals in mind:

- We would like to grow the current KISTI CDF computing contribution so that a significant fraction of CDF's Monte-Carlo production is produced at your site.
- We would like to establish a computing plan for the next 3 to 5 years where by the available KISTI resources for CDF remain a constant fraction of the total. In addition, and if possible, we would like to be able to opportunistically take advantage of non-CDF computing at KISTI when needed.
- To expedite our use of these resources, we would like that, initially, the model by which jobs get submitted and data retrieved to be one that is already supported by CDF. We have a submission method for OSG and for LCG.

Furthermore, we would like you to be aware that we are now developing a new model for CDF Grid Computing Centers ("CGCC") to be even more efficient in Monte-Carlo data production and in cataloging and transporting of this data to FNAL. We would like to take full advantage of KISTI's extensive GRID experience to implement the current model and also to collaborate with the CDF group currently in charge of improving the CDF CAF middleware to adapt to the evolving GRID technology. We expect that Drs. Kihyeon Cho and Hyunwoo Kim, as the contact people between KISTI and CDF, will

Request CDF Grid Computing Center at KISTI

We welcome your suggestions on your perspective on how this collaboration can be best made. Please let us know if you have any questions and hope to hear back from you soon.

Best regards,

Robert Roser and Jacobo Konigsberg
Spokespeople CDF experiment

cc: Dr. Okhwan-Byeon, Director e-Science Division, KISTI

B Physics common searches

- Physics stream

- ❑ B physics with different data based on $\mu\mu$ and 2 track triggers mainly for B_s Mixing (CDF discovery in 2006) pursuing since one year on CP violation studies in the B_s sector
- ❑ Same physics streams

- $B \rightarrow J/\psi \Phi$: CP violation related studies

- ❑ CP even and odd measurement: $\sin 2\beta_s$ (France)
(started by G.P. di Giovanni and ASN)
- ❑ $B \rightarrow J/\psi K^*0$ validation sample & competitive results with Babar/Belle (France)
- ❑ $B \rightarrow J/\psi \Phi X$, $\psi(2S) \Phi X$ (Korea)

=> The B_s sector is a crucial Physics topic for searches beyond standard model at CDF.

Developing common interest in Top/Higgs searches

- Both Korea and France have been working on top Physics:
 - => top into dileptons (Korea)
 - => top into dilepton including one τ lepton (France)
 - => single top (Korea and France)
- Now we intend to develop a common line of research, with the acquired experience of both teams, focused on the study of top pairs into τ leptons and as by-product the search for Higgs into τ pairs and charged Higgs into $\tau \nu_\tau$

This common search line will bring an interesting breakthrough with the recorded data with the total Tevatron Luminosity and an important input for the LHC.

=>Need of large amount of MC production (KISTI and CCIN2P3)

Processing for CDF- LIA

- 2007 LIA- CDF Proposed
- LIA- CDF meeting
 - ❑ Date: 2007.8.16
 - ❑ Place: EXCO, Daegu, Korea
 - ❑ Participant: Prof. Francois Le Diberder, Hyunwoo Kim, Kihyeon Cho
 - ❑ Content: At the first steering committee, CDF will join LIA project.
- Exchange Visiting
 - ❑ Kihyeon Cho: Visiting IN2P3 (5/27/07- 6/3/07)
 - ❑ Hyunwoo Kim: Visiting CC- IN2P3 (2/13/08) with C. Ciobanu (LPNHE)
 - ❑ Aurore Savoy- Navarro: Visiting KISTI (9/8/08- 9/9/08)
- Fermilab visiting for co- works
 - ❑ Kihyeon: 03/13/07- 03/25/07 meeting with G.P di Giovanni
 - ❑ Hyunwoo: 09/15/07- 09/30/07
 - ❑ Hyunwoo: 11/21/07- 11/23/07
 - ❑ Hyunwoo: 04/09/08- 04/10/08
 - ❑ Kihyeon: 07/17/08- 07/26/08 meeting with A.Savoy- Navarro



CDF Collaboration meeting at University UPMC, May 2007

Backup

August 16, 2007

- >> Dear Aurore,
 - >>
 - >> This afternoon, I have talked with Prof. Francois Le Diberder,
 - >> deputy director of IN2P3. I have explained all the relations
 - >> between KISTI- IN2P3 on CDF. Now everything is clear for LIA- CDF.
 - >>
 - >> The first thing of LIA project is to construct LIA- Korea. in order
 - >> to claim to CNRS for LIA, Prof. LeDiberder claims for LHC and ILC
 - >> only for the future experiments. This is consistency for LIA- Japan
 - >> and LIA- China.
 - >>
 - >> Then, there will be the string committee of LIA- Korea which
 - >> will review all particle physics or astroparticle physics. So,
 - >> CDF is good enough to be put on the list at the steering committee.
 - >> This is actual LIA for fund and real work. Therefore, according to
 - >> him, we don't have to worry about LIA- CDF. We, CDF, are enough
 - >> for the actual stage of LIA- Korea.
 - >>
 - >> For the time schedule of LIA- Korea, France side is delayed due
 - >> to LIA- China. Now that LIA- China has been done on June 30, 2007,
 - >> it is time to set LIA- Korea. The contract of LIA- Korea will be done
 - >> mid- September. Then one month after, the string committee of
 - >> LIA- Korea will be held and CDF will be put on the list at that time.>>
 - >> That is my understanding from him and it sounds good to me.
 - >> Therefore, our proposal of LIA- CDF is good. One more thing is
 - >> that you can put his or her name on the CDF list even if one do
 - >> not work on full time (100%) CDF.
 - >>
 - >> If you have any questions, please let me or him know.
 - >> Hope to make myself clear.
 - >> Thanks.
 - >>
 - >> Sincerely,
 - >>
 - >> Kihyeon Cho

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