US-ATLAS AGENCY REVIEW JULY 2004

Ian Hinchliffe LBNL

July 6, 2004

Current ATLAS Physics Organization and US roles

Physics Coordinator (currently Giacomo Polesello) and deputy (me)

Each physics group has 2 conveners who serve 2 year terms
Monte Carlo (IH, LBNL), Top, Bottom, Standard Model (M. Dobbs LBNL), SUSY (F. Paige, BNL), Heavy Ions (H Takai, BNL), Exotics, Higgs.

Detector Performance groups have 2 conveners (some vacant), some serve fixed terms.
e/gamma, Jets (F. Merritt. U.C.) B-tagging, Muons

One person responsible for software validation (D. Costanzo, LBNL)

Note that this structure will surely change as data nears.
One deputy spokesperson (F. Gianotti) just appointed with responsibility for physics planning.

ATLAS Physics meetings

Physics groups meet in ATLAS weeks, three times per year, last one was June 21-25.
This is a snapshot showing talks at last week

- B-Physics: 9 talks 2 from US
- Higgs: 10 talks 3 from US
- Top: 8 talks 0 from US
- SUSY: 7 talks 1 from US
- Standard Model: 13 talks 2 from US
- Heavy ions: 5 talks 4 from US
- Exotics: 14 talks 3 from US
- Monte Carlo: 7 talks 2 from US

- While there is some concentrated activity in Higgs (Wisconsin), and SUSY (BNL, LBNL, Chicago, Texas), US people are active in all groups to some extent.

- The activity is larger than I would have expected since very few US students doing ATLAS physics. European groups have many students doing Ph.D's on ATLAS simulation. New US students will now join ATLAS

- US physics activity is increasing as people move from construction.

- As data approaches meetings will be more often and will take place outside ATLAS weeks.

- These meetings are usually available via phone/video. But start at midnight PST.

Some Recent Activities – US contributions I - B-Physics

Assessment of Possible Λ_b Polarization Measurements in ATLAS

ATLAS B-Physics Meeting
June 23, 2004

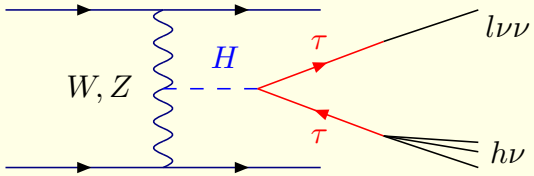
Homer A. Neal
University of Michigan

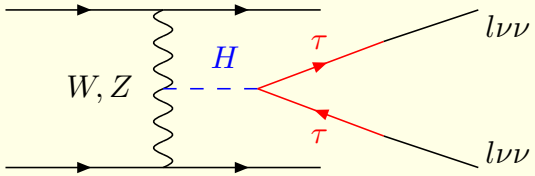
On behalf of the Λ_b Polarization Working Group

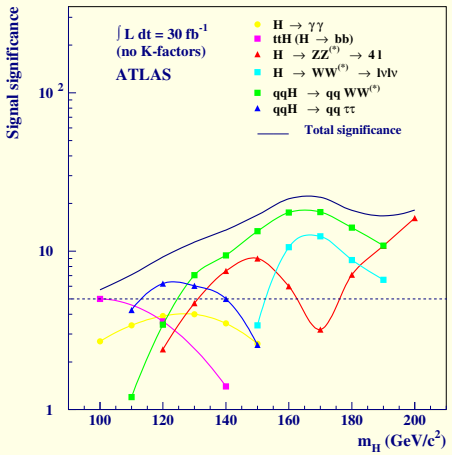
Michela Biglietti, Jacob Bourjaily, Homer A. Neal, Natalia Panikashvili, Maria Smizanska, Shlomit Tarem

Some Recent Activities – US contributions - II – Higgs

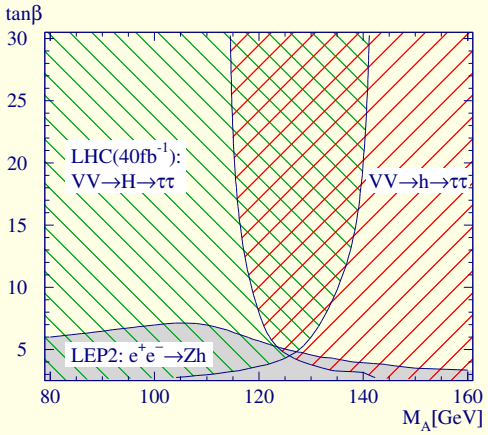
Introduction







Standard Model



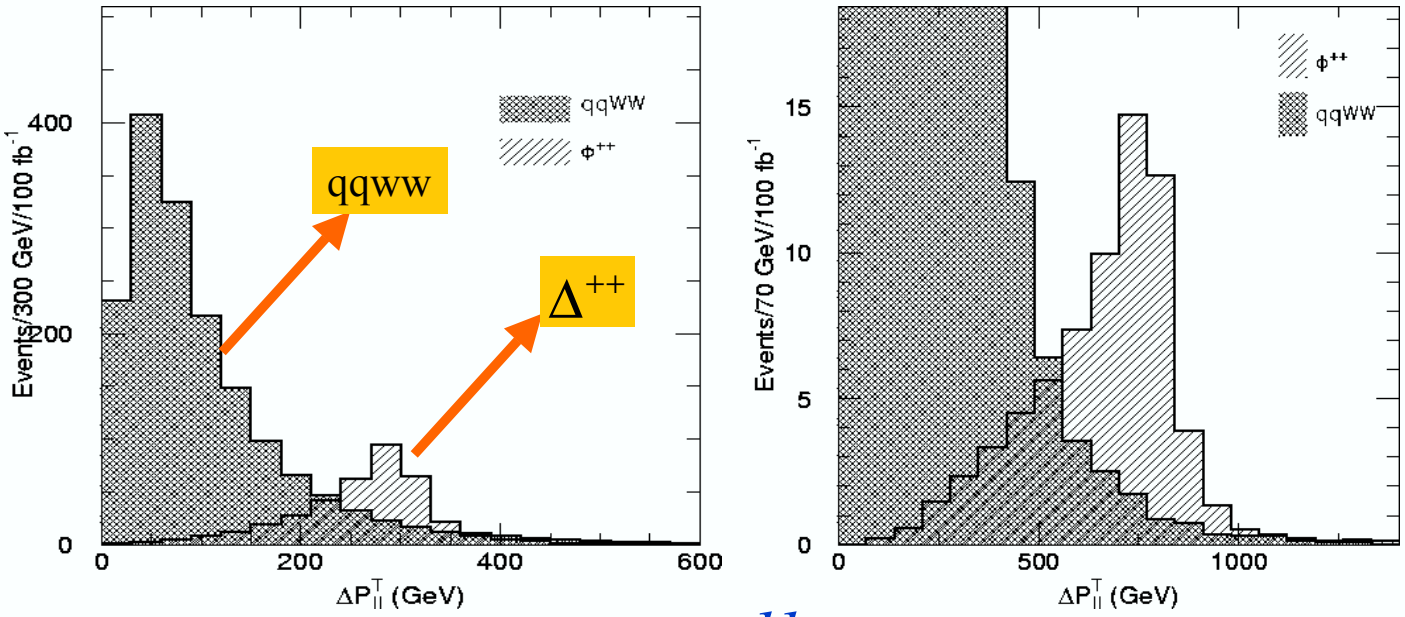
MSSM
from hep-ph/9911385

K. Cranmer, B. Mellado, W. Quayle, Sau Lan Wu
University of Wisconsin-Madison

Some Recent Activities – US contributions - III Exotics

$$\Delta_L^{++} \rightarrow l^+ l^+$$

$100 fb^{-1}$



$$\Delta p_T^{ll}$$

25 February, 2004

K. Benslama, Columbia University

Some Recent Activities – US contributions - IV – SUSY

b-tagging in SUSY events

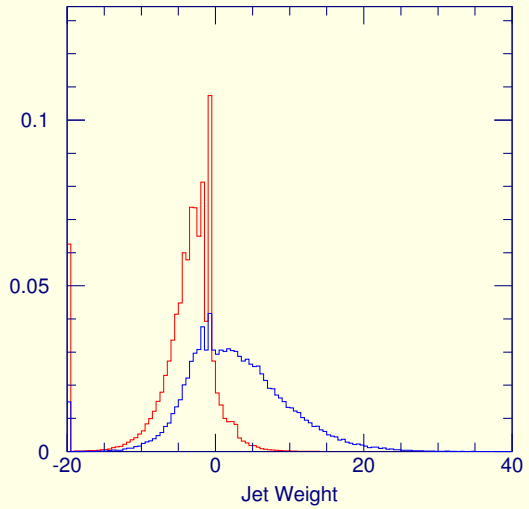
b-jets from $\widetilde{b}$ decays
used to Reconstruct initial state
(see next talk)

Readapt the code on the b-tag
group web page (1999)

Use 3D b-tagging in the last week

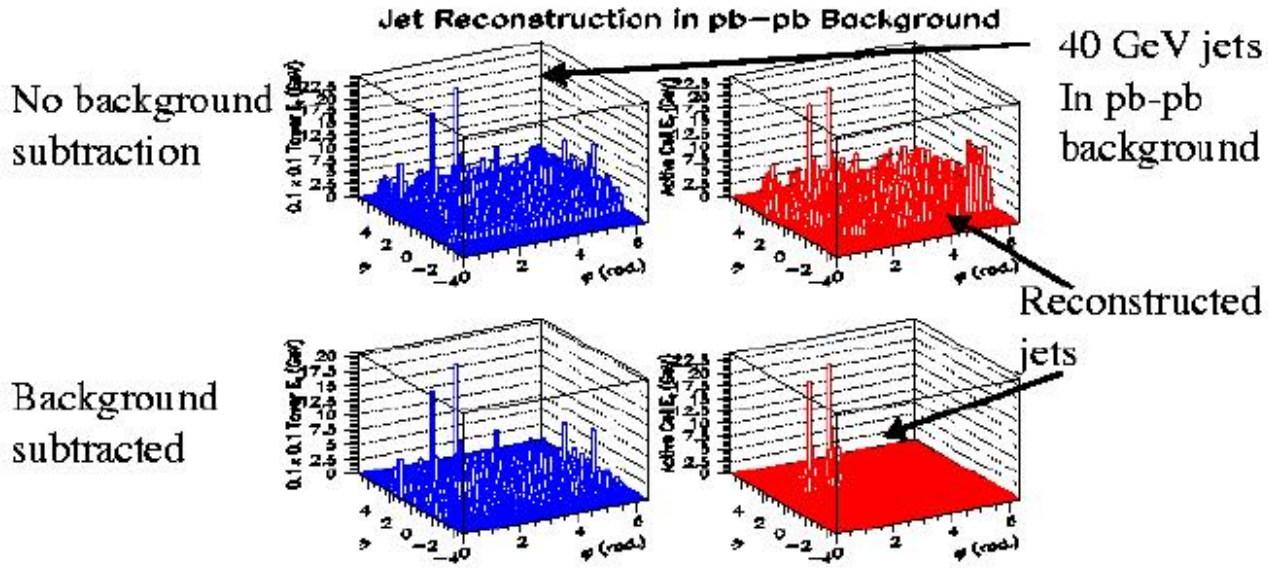
MC Truth: A jet is from b if a
B hadron is present in the jet cone

Jet weight defined with 2-3 tracks
passing quality cuts per jet



Some Recent Activities – US contributions V – Heavy Ions

Jet Reconstruction



- Original jets are reconstructed after background subtraction
- May be possible to see jets below 40 GeV

May 2003 Ketevi A. Assamagan, ATLAS Physics Workshop, Athens 2003 11

Recent talks at Conferences

ATLAS Physics talks at APS in Denver.

Armen Vartapetian, University of Texas at Arlington
Pierre-Antoine Delsart, Univ. of Montreal
Vladimir Savinov, Univ. of Pittsburg
Rashid Mazini, Univ. of Toronto
Kyle Cranmer, Univ. of Wisconsin
Ambreesh Gupta, Univ. of Chicago
Davide Costanzo, Lawrence Berkeley Nat. Lab.

Several talks at DPF in Riverside (August)

The Analysis Plan

US physicists are involved in world-wide effort. A US person is as likely to collaborate with a person from another US institute as one from elsewhere in the collaboration Therefore, US centric plan for US based physicists is not sensible if they are to be participating in the most important physics

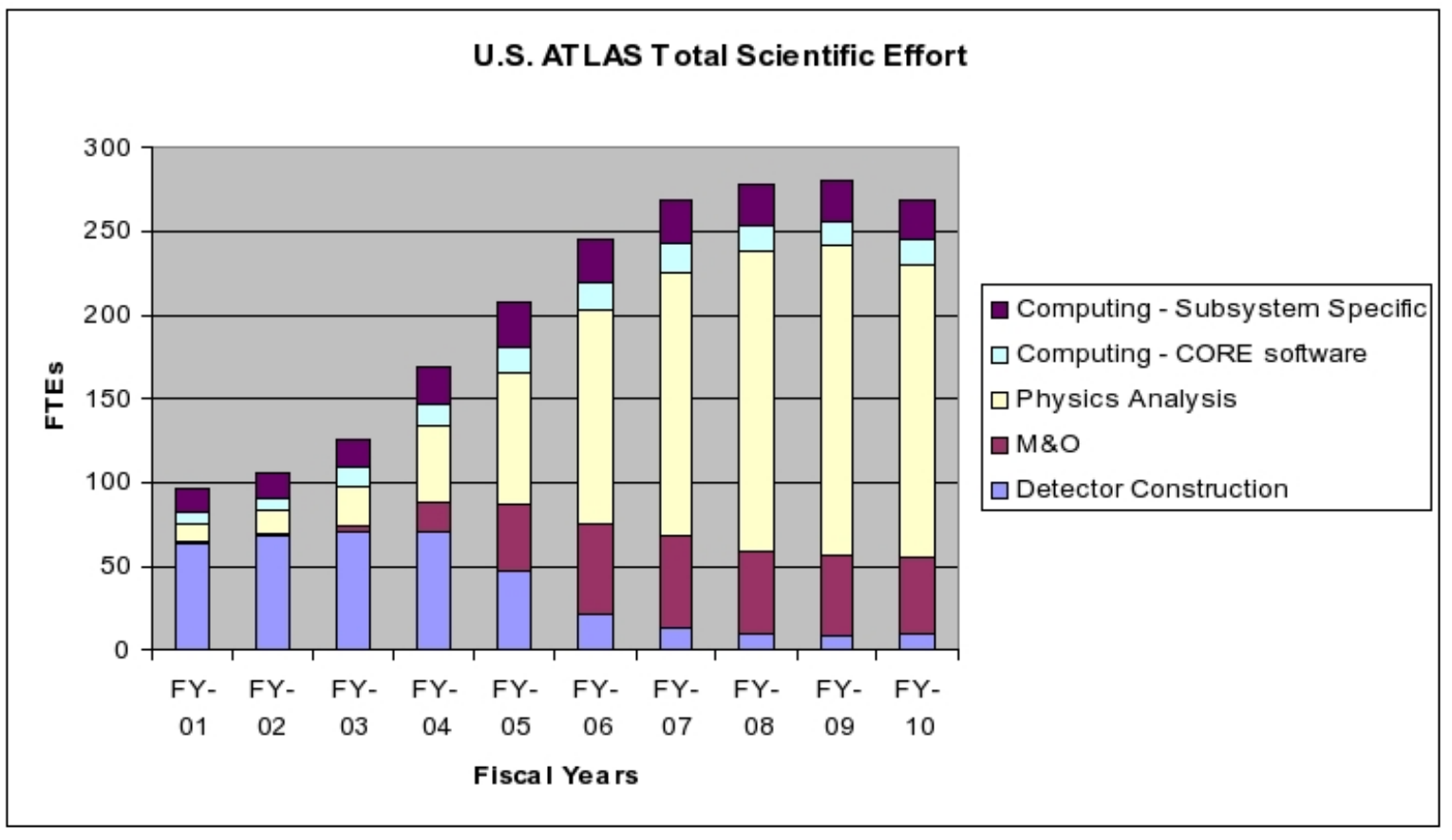
We have had several discussions in US ATLAS about the issues in developing our plan: there is broad agreement among the collaboration institutes

The facts we must face

- Computing model will be GRID based with limited analysis resources actually at CERN.
- Computing resources will be widely distributed; $e.g.$ US people at CERN might be running their jobs at Tier1/2 in US.
- There will be a very large number of analysis efforts
- New energy regime; significant physics is possible with few events. Search limits from $100pb^{-1}$ will exceed Tevatron limits for most new physics. $10\mathrm{pb}^{-1}$: 8000 $t\bar{t}$ events and 100 jets with $E_T > 1\mathrm{TeV}$
  Physicists who want to participate effectively, must be up to speed beforehand
- No pilot run in current schedule.
- All interesting physics topics will have people working on them outside of US-ATLAS

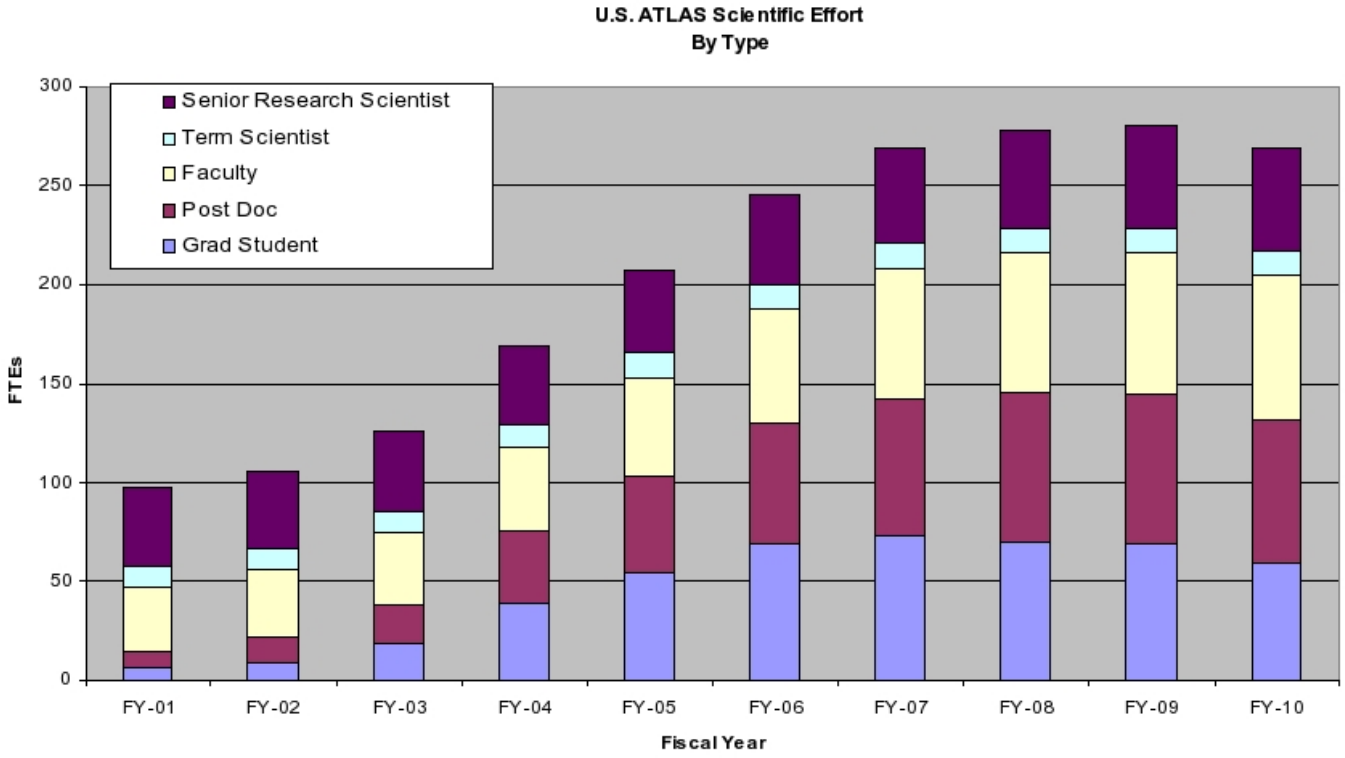
- We are 3 years from data on the current schedule
- Video conferencing is currently poor to CERN due to (a) poor equipment (b) reliance on VRVS. Phone and web is the preferred choice.
- We must have CPU/Disk beyond that committed to ATLAS as a whole

We represent about 18% of ATLAS

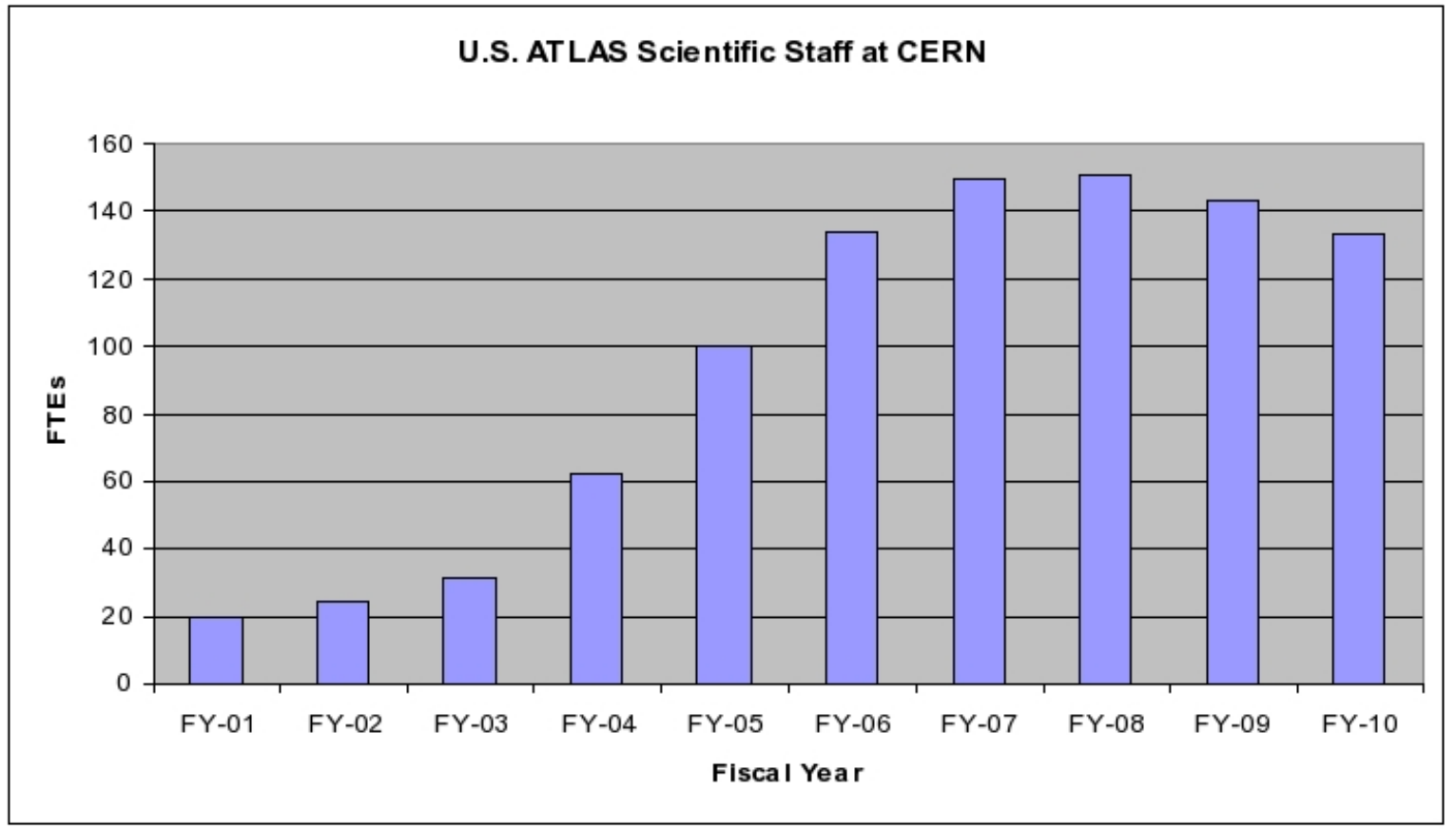


Much larger fraction will be "doing physics" in the next few years

More students coming



Some of these will be at CERN



This is FTE's, many are "commuting"

Empowering US Physicists I

We must ensure that

- US researchers based at CERN are properly supported
- US researchers working at their home institutes are properly supported
- US researchers who cannot travel to CERN regularly are integrated into collaboration wide activities

Two major problems

People new to "Physics" will need help getting started in a huge collaboration of perceived experts.

Software system is new: GRID may be totally unfamiliar, jobs and data are distributed worldwide

Empowering US Physicists II

To address these we have set up an "Analysis support" group consisting of US-experts in software and physics. Aim is to cover all subsystems

Davide Costanzo (LBNL), Ian Hinchliffe (LBNL), Peter Loch (Arizona), Fred Luehring (Indiana), Hong Ma (BNL, group leader), Frank Merritt (Chicago), Frank Paige (BNL), Srini Rajagopalan (BNL), Jim Shank (Boston)

$http://www.usatlas.bnl.gov/atlas\_psc/software/support/$

More details in Srini's talk.

This group will have succeeded if it becomes redundant

US-ATLAS meeting at BNL in August 2003

FY03 HEP Seminars

U.S. ATLAS Computing Meeting
August 27 - 29, 2003

AGENDA

Wednesday, August 27, 2003, Large Conference Room, Medical Building 490
Session: Software Tutorial

09:00	Richard Baker, BNL Introduction to U.S. ATLAS Facilities	Slides (ppt, pdf)
09:15	Hong Ma, BNL Overview of ATLAS Software, Software Environment at BNL	Slides (ppt, pdf)
10:00	Wim Lavrijsen, LBNL Hands-on: Athask, Running ATLAS Software Interactively	Slides (pdf)
11:00	Karl Harrison, UK Hands-on: Ganga, Running ATLAS Software in Production Mode	Slides (ppt, pdf)
12:30	**Lunch break, BNL cafeteria**	
14:00	P. Calafiura, LBNL Hands-on: Athena Framework and EDM Developer's Tutorial	Slides (pdf1, pdf2, pdf3)
15:30	S. Rajagopalan, BNL Hands-on: Writing a Z to ee Reconstruction Algorithm in Athena	Slides (ppt, pdf)
18:00	**Clam-Bake, Physics Department Courtyard, Building 510A** **Rain-Backup: Recreation Hall**	

Thursday, August 28, 2003, Hamilton Seminar Room, Chemistry, Building 555
Session: Physics, Chair: Ian Hinchliffe

09:00	Ian Hinchliffe, LBNL Introduction	Slides (pdf)
09:15	Bruce Mellado, Wisconsin Higgs: ATLAS Studies and Status	Slides (ppt, pdf)
09:55	Frank Paige, BNL SUSY in ATLAS	Slides (pdf)
10:35	**Coffee**	

10:55	John Parsons, Columbia Top and Electroweak	Slides (ppt, pdf)
11:30	Peter Loch, Arizona G4 Physics Issues	Slides (ppt, pdf)
12:00	Helio Takai, BNL Heavy Ions	Slides (ppt)
12:30	Ian Hinchliffe, LBNL Little Higgs Models, Future Plans including Physics in DC2	Slides (pdf, conclusion.pdf)
13:00	**Lunch, BNL Cafeteria**	

Thursday, August 28, 2003, Hamilton Seminar Room, Chemistry, Building 555
Session: Core Software, Chair: S. Rajagopalan

14:00	S. Rajagopalan, BNL Introduction	Slides (ppt, pdf)
14:20	Paolo Calafiura, LBNL ATLAS Framework and EDM	Slides (pdf)
14:45	David Malon, ANL The ATLAS Database	Slides (ppt, pdf
15:10	Torre Wenaus, BNL The LCG Project	Slides (pdf, ppt)
15:35	**Coffee**	

Thursday, August 28, 2003, Hamilton Seminar Room, Chemistry, Building 555
Session: Reconstruction and Simulation, Chair: F. Luehring

16:00	Fred Luehring, Indiana Overview of Reconstruction and Simulation	Slides (ppt, pdf)
16:20	Reiner Hauser, Michigan State ATLAS High Level Trigger	Slides (pdf)
16:45	Bill Seligman, Nevis LAr Simulation	Slides (pdf)
17:10	Ambreesh Gupta, Chicago Jet Reconstruction and Calibration	Slides (ppt, pdf)
17:35	Jim Shank, Boston University Muon Reconstruction	Slides (ppt, pdf)
18:00	**Dinner on your own.**	

Friday, August 29, 2003, Chemistry, Hamilton Seminar Room, Building 555
Session: Facilities and Grid, Chair: Jim Shank

09:00	Richard Baker, BNL	Slides (ppt, pdf)

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09:00	Richard Baker, BNL	Slides (ppt, pdf)

All speakers were from US

Preceded by software tutorial

Empowering Physicists III

- We have (every few weeks) US meetings open to all via phone and web
- US groups have some people at CERN and some at home institutes with rotation.
- US institutes can send their people to BNL, Tier 2 and other US sites, particularly for software training. But we do not expect Universities to have people based permanently at BNL. We will have a virtual center, based on GRID, remote meetings and distributed groups doing analysis
- There may be regional US groups
  One has started in Midwest, Monthly via phone/video and in person $http://hep.uchicago.edu/\sim agupta/usatlasmidwest.html$ I expect that these groups will be based on physics interests not geography.
- Goal must be ATLAS papers

Near Future Goals

- DC2 (Tier0/Tier1 Test) will complete in August – See Bruce talk. First large scale production with Geant-4
- Next is Physics production for Rome meeting (June 2005) using DC2 machinery. Initial geometry. First test of ESD/AOD scheme.
  First user experience of distributed computing model.
- We must ensure a high US contribution to work presented at the Rome meeting. There were 13 (/100) US talks at Athens in 2003
- DC3 running from Sept 2005 to March 2006 will provide data for "Physics Readiness" report in June 2006.

Data Phase

- Data taking with cosmic rays starts in 2006.
- Experts will be fully employed on software and detector commissioning: Users need to trained before this phase starts
- Some data taking with "beam-gas" in 2007
- Collisions in July 2007

First Physics papers before end of 2007

THERE MUST BE ADEQUATE BASE SUPPORT FOR STUDENTS AND POSTDOCS