

Computing report

M. Morandin - INFN Pd

on behalf of the SuperB computing group

Dec. 4 2009

Summary

- Recent progress:
 - full sim
 - fast sim
 - production environment, code repository
- Coordinated productions:
 - November generic production
 - February generic production
 - January full sim background production
- Web site
- R&D program workshop

Full Simulation

In use for:

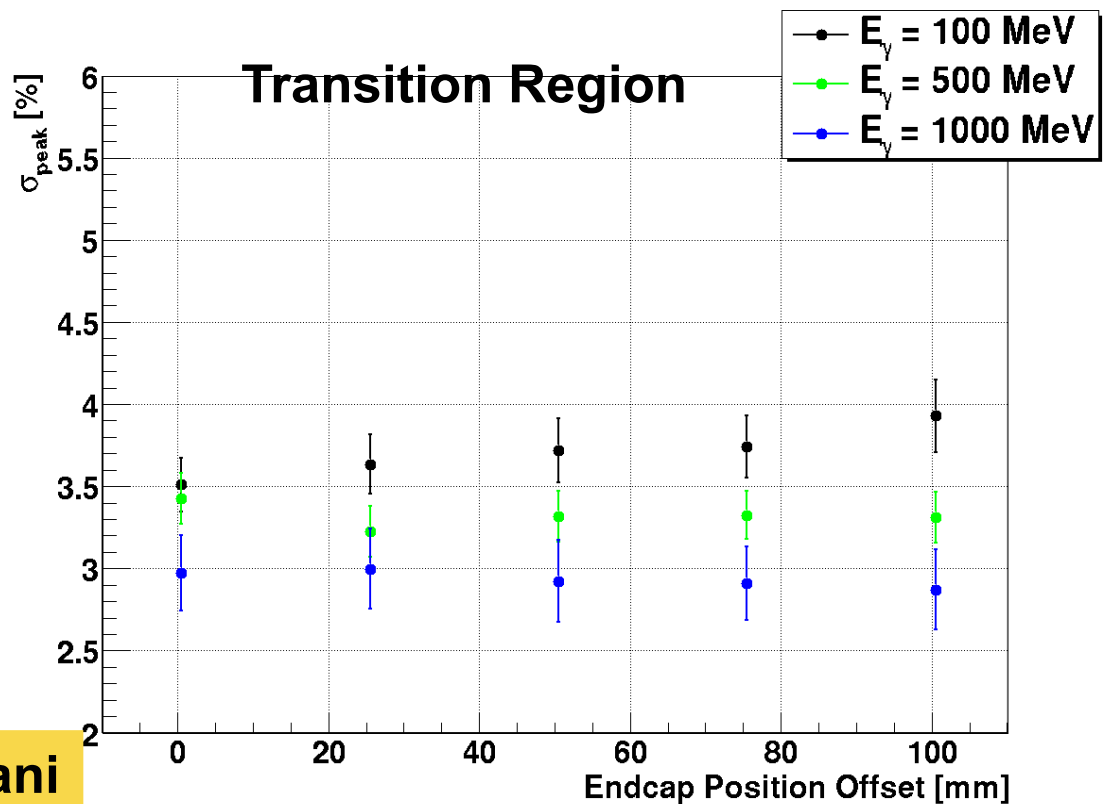
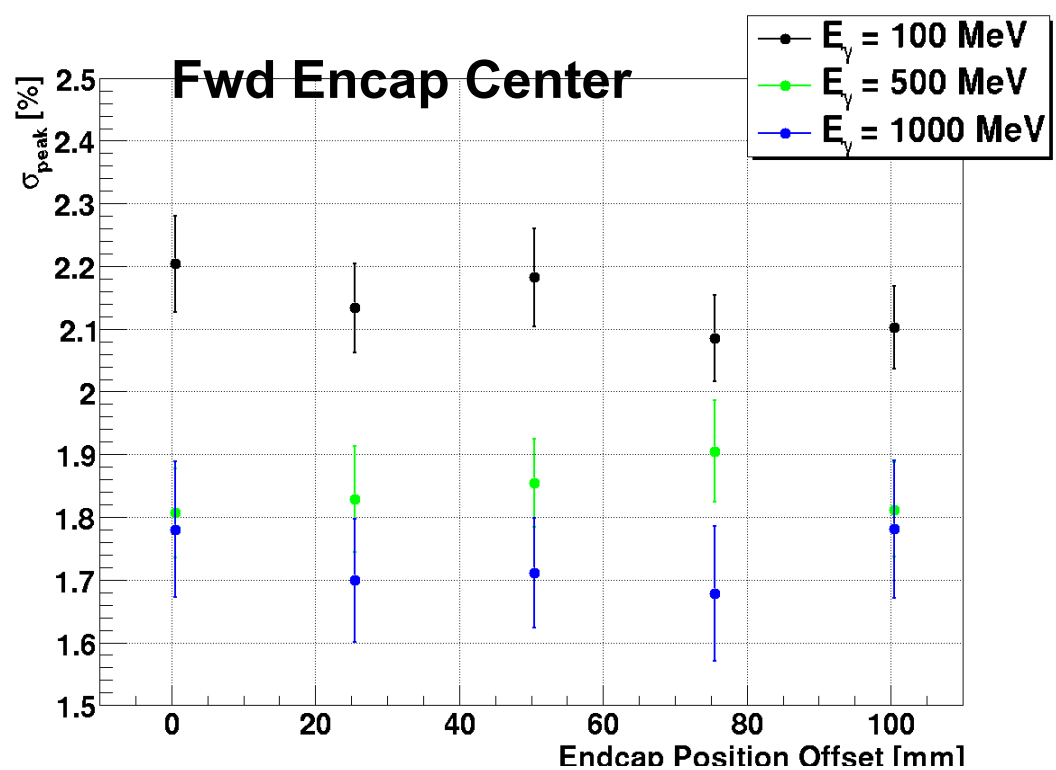
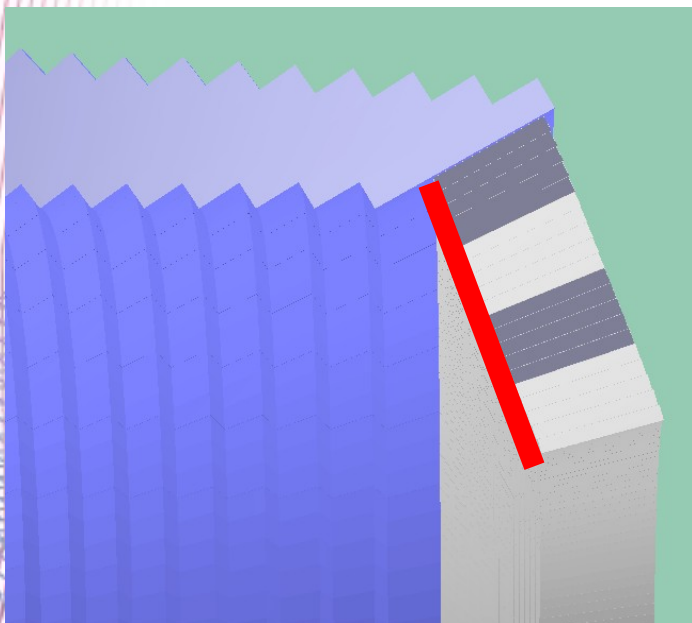
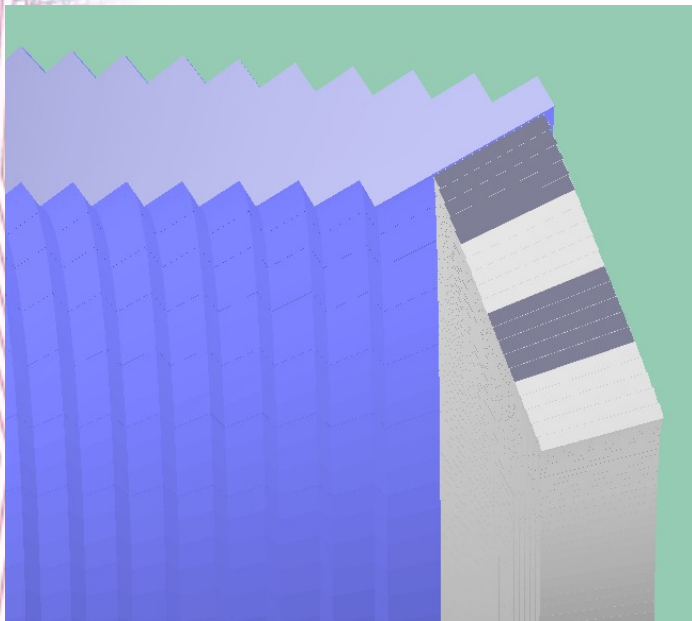
- Background frame production for FastSim
- Background hit rates/doses studies in subdetectors
- Geometry optimization (IFR, EMC)

Core developments since SLAC meeting:

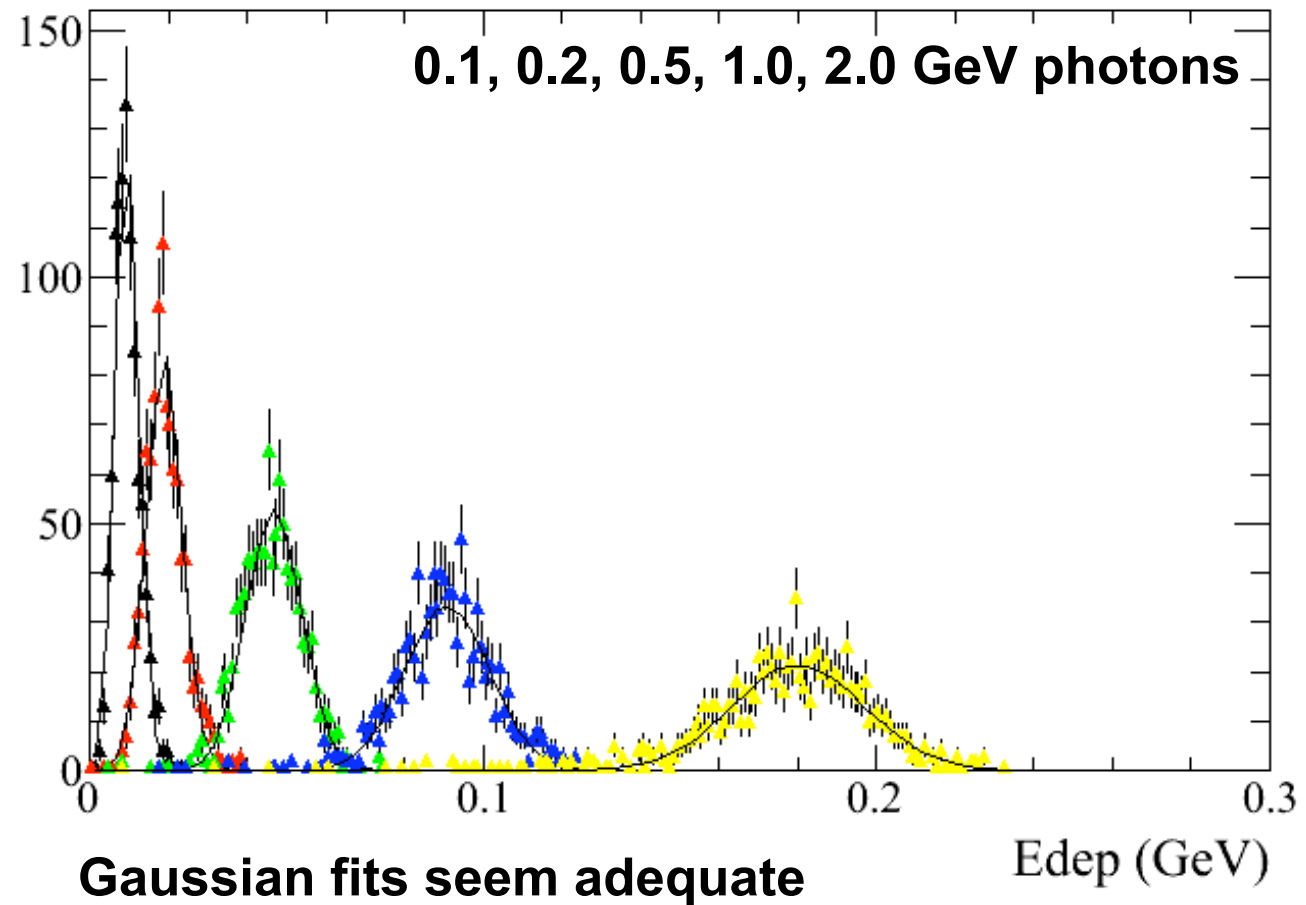
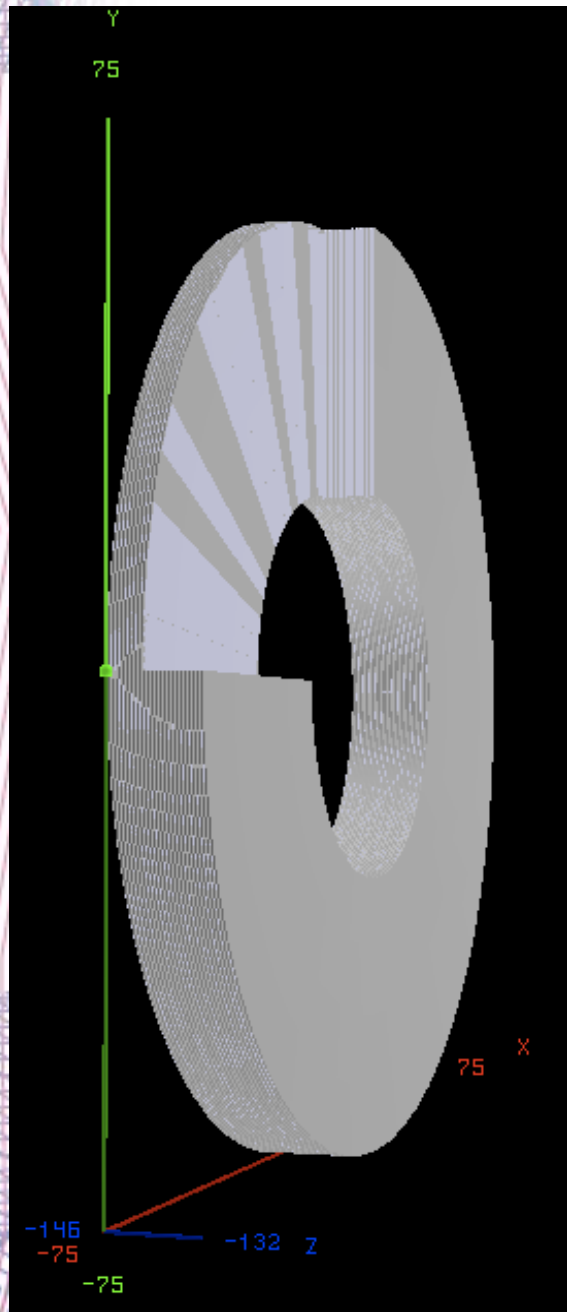
- Filtering of tracks passed to FastSim
 - keep only particles likely to produce hits
- Packaging of Bruno (in progress)

FW EMC Position

FW PID effects



Backward EMC (C. H. Cheng)



The unexpected

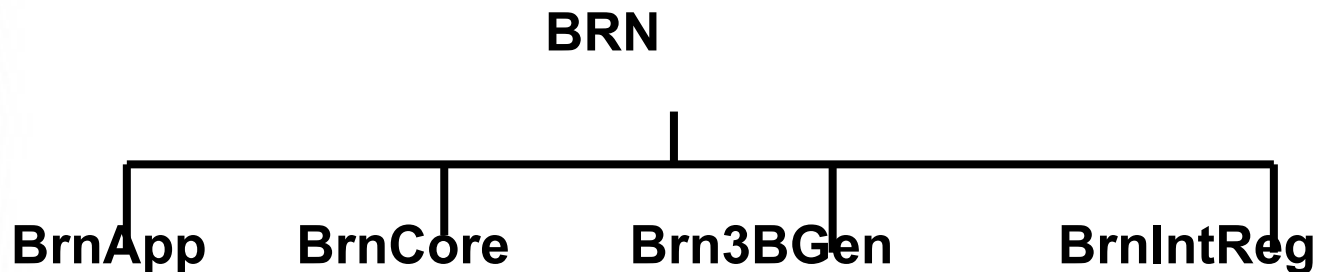
- After implementing latest features, a small validation pre-production was run
 - Result was not encouraging
 - 60% of jobs was failing
- This lead to a (painful) debugging exercise, involving several developers
 - Not going into the details now: at the end, it looks like during one of the commits a real G4 bug was uncovered
 - Its effects are masked by the step limitation in the final focus
 - we can safely run productions, provided we keep that setting (ON by default)
- Apart from the specific case, I believe the lesson here is about software validation
 - We should agree on a minimal set of tests that every developer is requested to perform (and pass) before committing his/her code

lesson learned

- As a seed for the discussion, I would suggest:
 - In case of gdml changes, run the geometry test before and after the modification
 - check that no NEW clashes are introduced
 - For all the rest, simulate at least 500 beamstrahlung events, and at least 5000 single particles (electrons or hadrons, depending on the detector affected)
 - All jobs must succeed
- This should be run ideally at every commit by the developers
 - Should we provide helper scripts for job submission?
- To be complemented by tests with higher statistics when tagging/releasing
 - To be run by whoever tags/releases

Bruno Packaging

- The code is split in several packages (directories) within one or more subversion repositories
- It shares the same software tools used for FastSim
- Current packages:



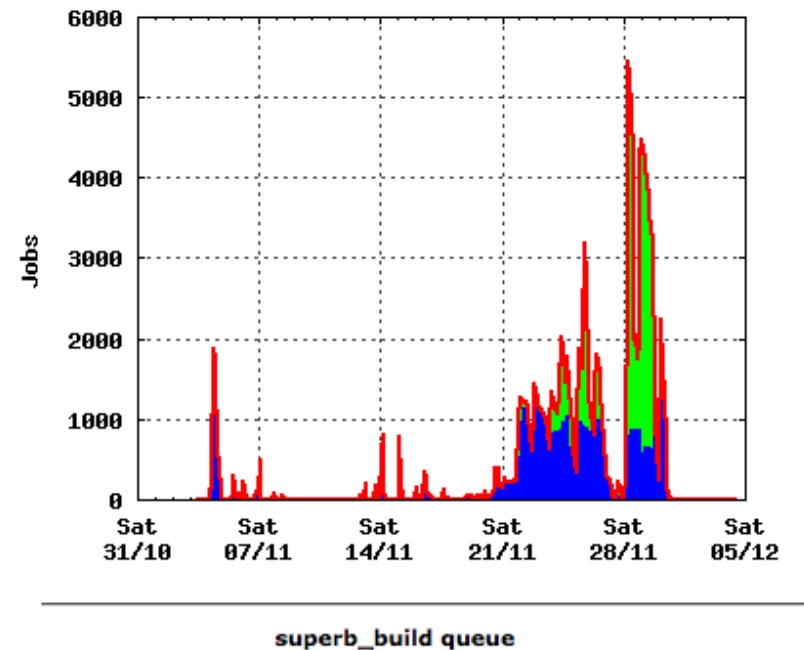
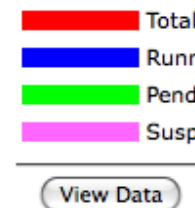
- Bruno subversion repository: <https://sbrepo.pd.infn.it:8910/BRN>
- Next step: move subdetector code out of BrnCore into specific packages
- Release and distribution mechanisms similar to the one setup for Fast Sim will also be implemented

FastSim November Production

- Repeat September 2009 production
 - Same resources, statistics, background modeling
 - More analyses, generator modes
 - bug fixes
- Release V0.1.2
 - consolidate Patches used in September production
- Validation procedure established
 - Subsystem experts identified for Trk, Svt, Emc, Pid
 - problems identified before production

Successful exercise

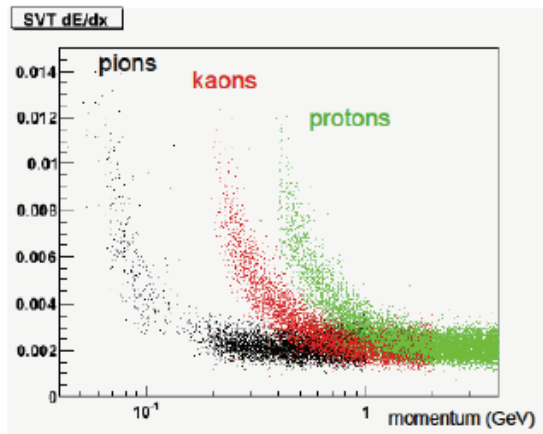
- production run rather smoothly at CNAF
 - up to 1K cores used
- production was operated by David B.
- **we should be grateful to him and the CNAF/Ferrara production team for the hard work**
 - we clearly need an operation team for the next production
 - please provide candidates
 - we already got some feedback but we need more



Progress since October

Tuning SVT dE/dx

- Only crude tuning of dE/dx to BaBar performance has been done
 - probably good enough, though, given our currently level of knowledge about the SuperB detector
- Procedure:
 - adjust hit uncertainty parameter p_1 to give desired track dE/dx resolution of 16% for minimum ionizing pions



J. Walsh

XI SuperB Workshop, Frascati, Dec 2009

SVT dE/dx implemented and used in Pid selectors
J. Walsh, L. Burmistrov

Pion and Kaon LH – based selectors

- SVT - (dE/dx)
- DCH - (dE/dx)
- DRC - Cerenkov angle
- number of photons
- Backward EMC - time
(just added to FastSim)
- Forward PID system
- RICH Cerenkov angle
or
(currently not in FastSim)
- Time Of Flight (TOF)
(purrr physical model in FastSim)

Each of these subsystems should have 6 parameters which used to construct Pi/K LH – based selectors

- 1) Measured value
- 2) Expected error
- 3-6) expected value for particle hypothesis

Construct pulls



$$\text{pull} = (\text{val}_{\text{meas}} - \text{val}_{\text{exp}}) / \text{err}$$

Gaussian Likelihood value



$$\text{LH} = e^{(-\text{pull}^2/2)} / \text{norm}$$

Combine information from all subsystems

$$\text{LH}_{\text{tot}} = \text{LH}_{\text{DRC_Cerenkov}} \times \text{LH}_{\text{DRC_PhotNum}} \times \text{LH}_{\text{DCH}} \times \text{LH}_{\text{TOF}} \times \text{LH}_{\text{SVT}} \times \text{LH}_{\text{EMC_bwd}}$$

Construction of the Likelihood ratios

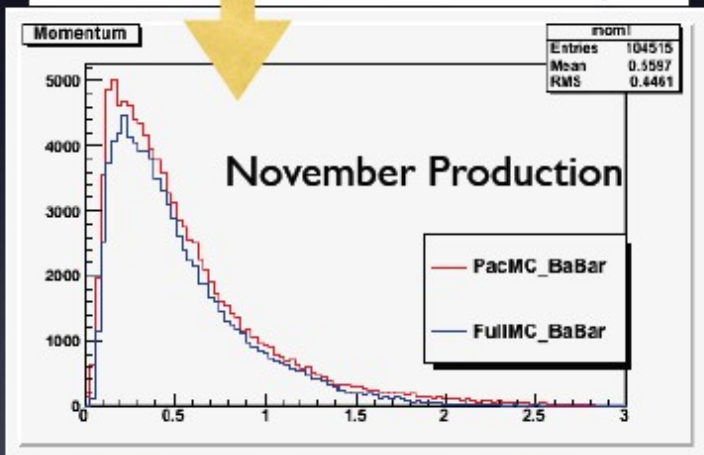
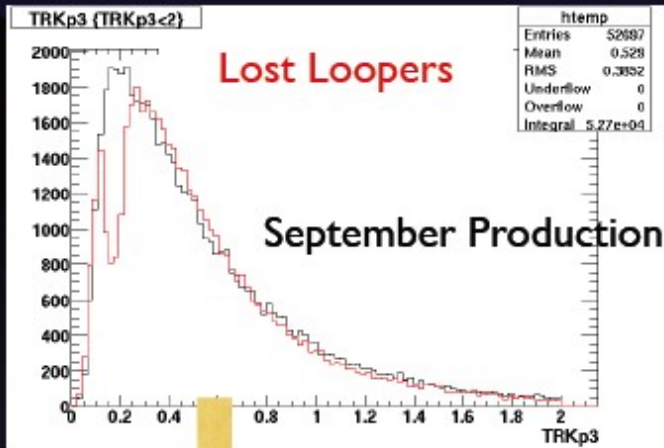


$$\text{LHR}_{\text{KvsPi}} = \text{LH}_K / (\text{LH}_K + \text{LH}_{\text{Pi}})$$

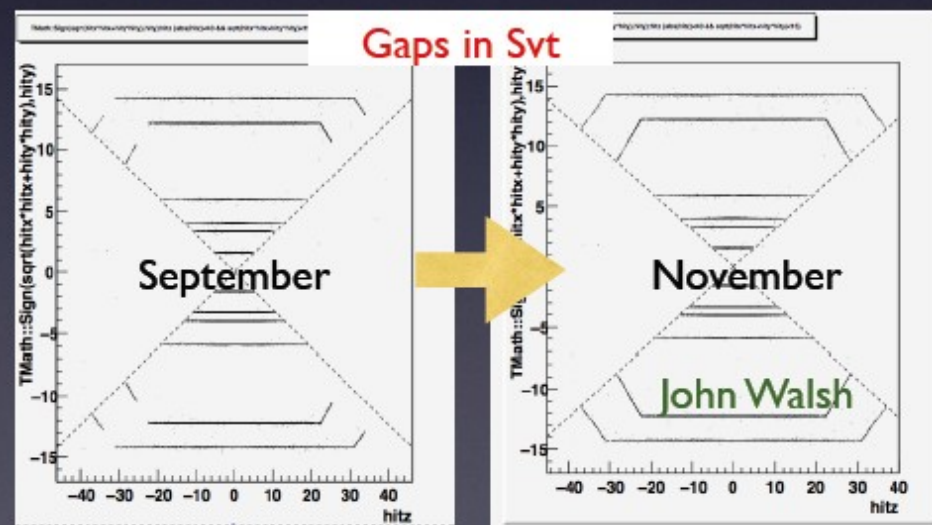
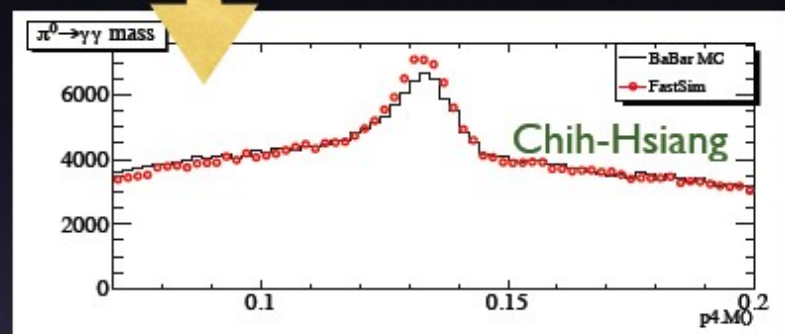
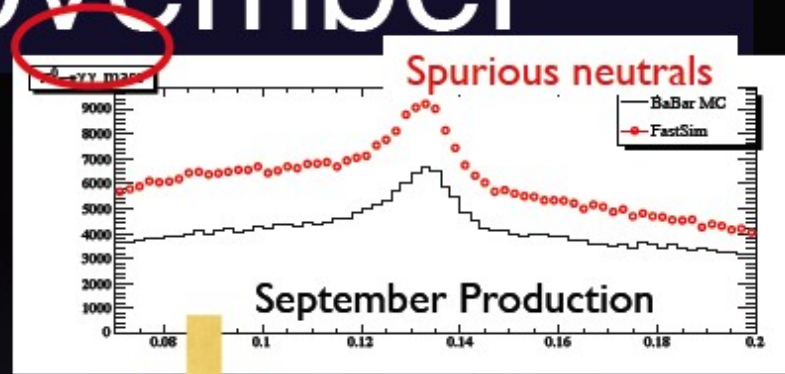


cut on Likelihood ratios to select tracks

Fixes for November



Plus many
memory fixes



Output being used

FastSim meeting

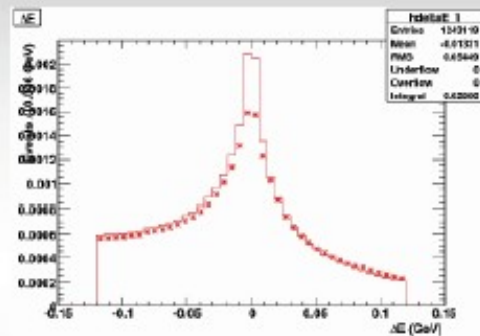
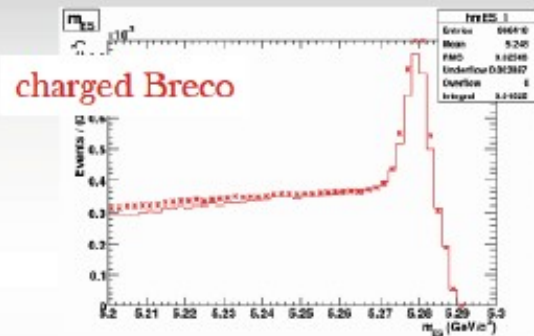
December 3, 2009



Fast Sim DG_BaBar vs BaBar Full Sim (III)

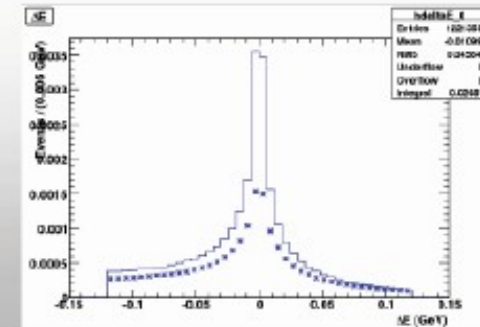
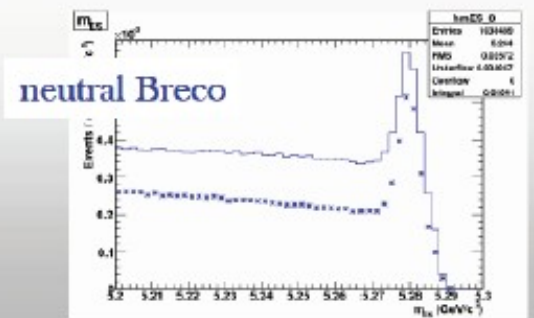


* m_{ES} and ΔE before the selection



* BaBar FullSim
— FastSim DG_BaBar

◆ ccbar + B0B0 + B+B-



◆ ccbar + B+B- + B0B0

elisa manoni

10

New production tools

- new job submission and monitoring tools used in Nov. production
- use of new production DB to track jobs and output files

SuperB Production Manager

Home Production Init Production Monitor

Production Initialization and Submission

PRODUCTION FORM

Production Data

Production Series: [dropdown]

Production Series: [input]
 Production root: [input]
 Fast TAG: [input]
 ARCH: [input]
 Release working Directory: [input]

Minimum Run Number: [input]
 Software Revision: [input]

Production Monitor

PRODUCTION SERIES

Production Series: 2009_November

Production root: /storage/gpfs_babar6/sb/prod/
 Fast TAG: V0.1.2
 ARCH: Linux26SL4_I386_gcc346
 Release working Directory: /home/BABAR/brownd/SuperB/FastSim/V0.1.2_prod/workdir/

JOBS DATA

Runnum	# of events	Geometry	Soft release	Job Status	Grid Status	Grid Job Id
100000	B+B-_taunu_DX	DG_1	V0.1.2 179	done	ALL	2183764
100000	B+B-_taunu_DX	DG_1	V0.1.2 179	done	ALL	2183765
100000	B+B-_taunu_DX	DG_1	V0.1.2 179	done	ALL	2183766
100000	B+B-_taunu_DX	DG_1	V0.1.2 179	done	ALL	2183767
100000	B+B-_taunu_DX	DG_1	V0.1.2 179	done	ALL	2183768
100000	B+B-_taunu_DX	DG_1	V0.1.2 179	done	ALL	2183769
100000	B+B-_taunu_DX	DG_1	V0.1.2 179	done	ALL	2183770
100000	B+B-_taunu_DX	DG_1	V0.1.2 179	done	ALL	2183771
100000	B+B-_taunu_DX	DG_1	V0.1.2 179	done	ALL	2183772
100000	B+B-_taunu_DX	DG_1	V0.1.2 179	done	ALL	2183773

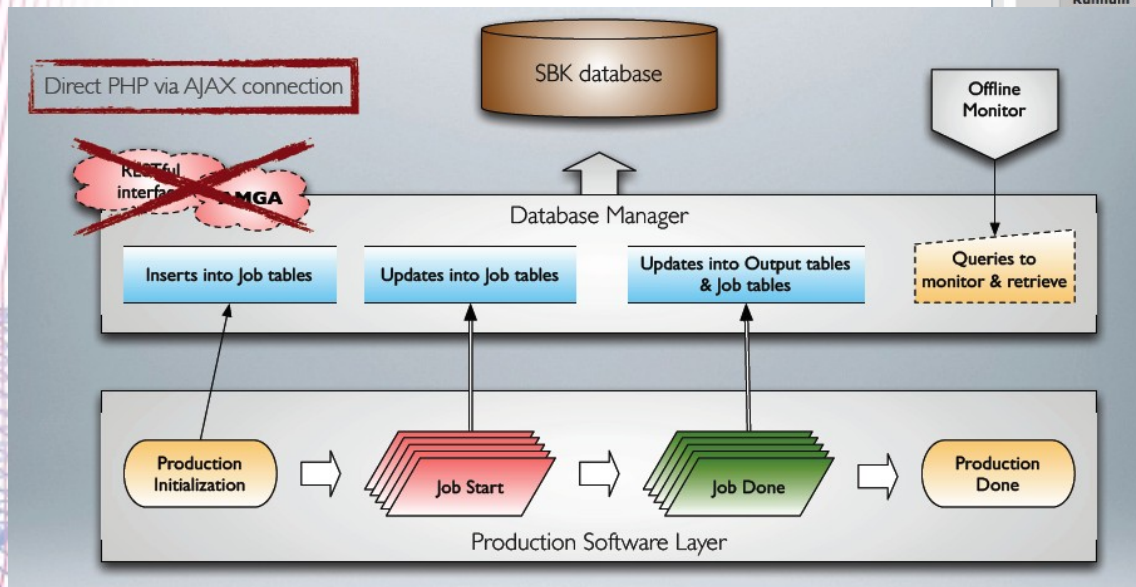
10 jobs found matching the search criteria.

MONITOR

JOB STATS

Status	# of jobs	events (10^6)
done	5515	551.5
failed	779	77.9
running	9	0.9
submitted	7	0.7
Total	6310	631

First Run number: 30000
 Last Run number: 36309



A. Fella, E. Luppi, M. Ranzano, L. Tomassetti

Development for Feb. production

- More complete background simulation
 - e^+e^- pairs, neutrons, Touschek (?)
- Better tracking simulation
 - Full Kalman fit (outwards + inwards)
 - Tracking pat. rec. confusion simulation
 - hits randomly mis-assigned based on density, proximity
- Additional analyses, generators
 - τ LFV, polarized τ , 2-body, SL tags, ...

Requirements for the Feb. production

- reviewed at the Joint Comp+Det+Phys session
 - for detector/geometry studies:
 - Veto detectors performance studies with rare decays channels
 - rear EMC (could be turned on/off in analysis)
 - forward PID
 - two geometries (forw. PID in/out) at the 1 ab^{-1} level
 - BaBar reference geometry at $\sim 0.1 \text{ ab}^{-1}$ level
 - for physics studies:
 - most analysis (WG1-2, WG4-5) happy with $O(1 \text{ ab}^{-1})$ statistics
 - tau decays (WG3) would need $O(100 \text{ ab}^{-1})$ statistics
 - will need fast filter at generator or event level
 - no urgent need for machine background mixing has been expressed
 - machinery ready on Full Sim side, injection into Fast Sim on the work, goal for February: rad. Bhabhas, eff. maps pairs prod. for SL0

Full Sim centralized production

- first production in January
 - 100k radiative Bhabha events per run
 - full detector geometry
 - 6 to 10 runs, still to be finalized (changing parameters, shielding)
 - approx. 5 days of running at CNAF
- schedule:
 - code and geometry freeze before Christmas
 - production performed at CNAF in the first half of January
 - post processing and analysis in the second half of January
- larger production could be scheduled if needed
 - 1 M Ev possible but not many runs

Setting up the distrib. prod.

- For scaling by one order of magnitude we need access to more sites than CNAF
- we have already established many contacts

CNAF

Caltech

SLAC

McGill

Queen Mary

RAL

LAL and Lyon

Bari

Legnaro - Padova

Napoli

Ferrara

Pisa

Italian group

Frank Porter, Piti Ongmongkolkul

Steffen Luiz, Wei Yang

Steven Robertson

Adrian Bevan

Fergus Wilson

Nicolas Arnaud, Dadoun Olivier

Giacinto Donvito, Vincenzo Spinoso

Gaetano Maron, Alberto Crescente

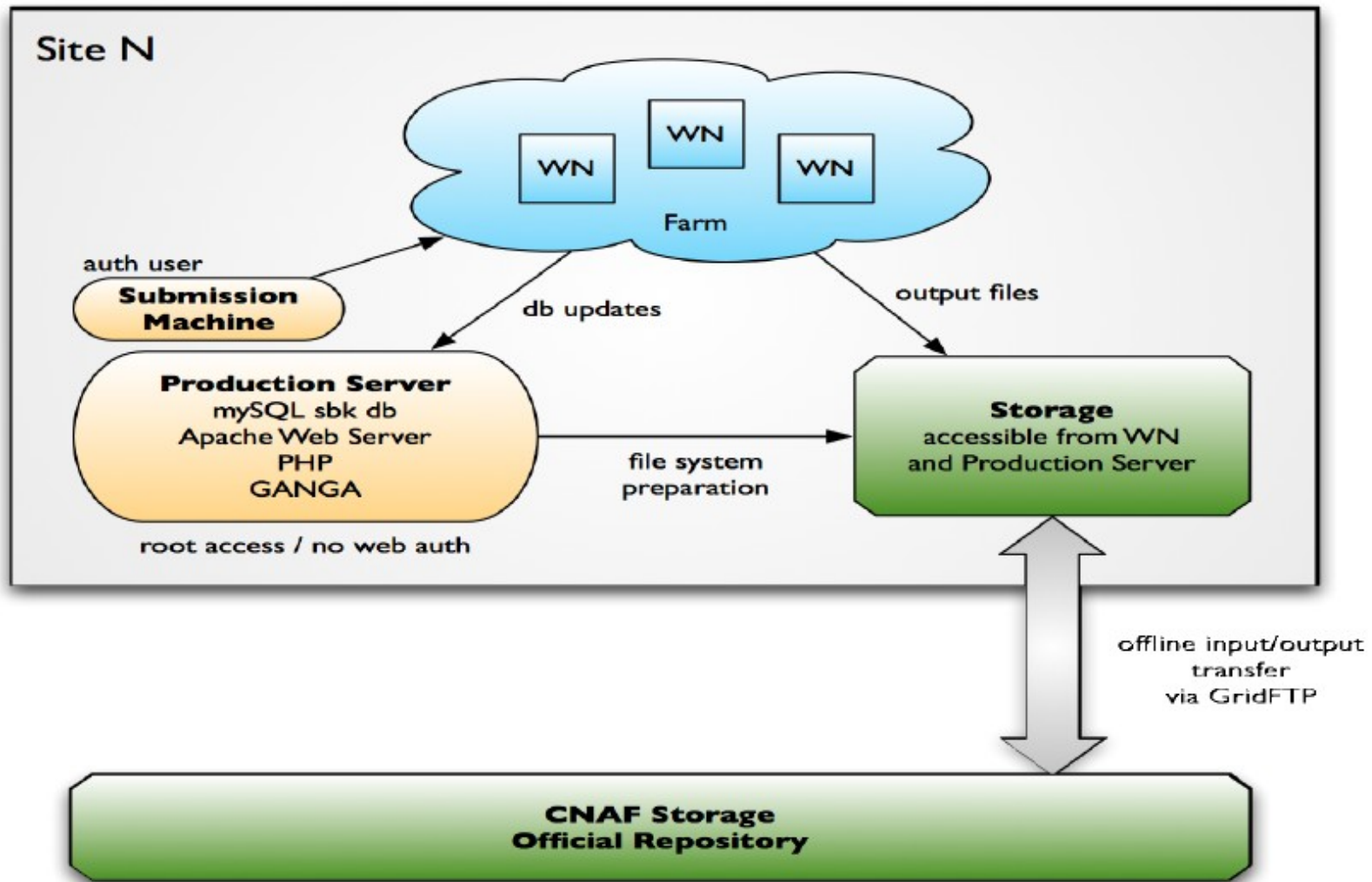
Silvio Pardi

Giovanni Fontana, Marco Ronzano

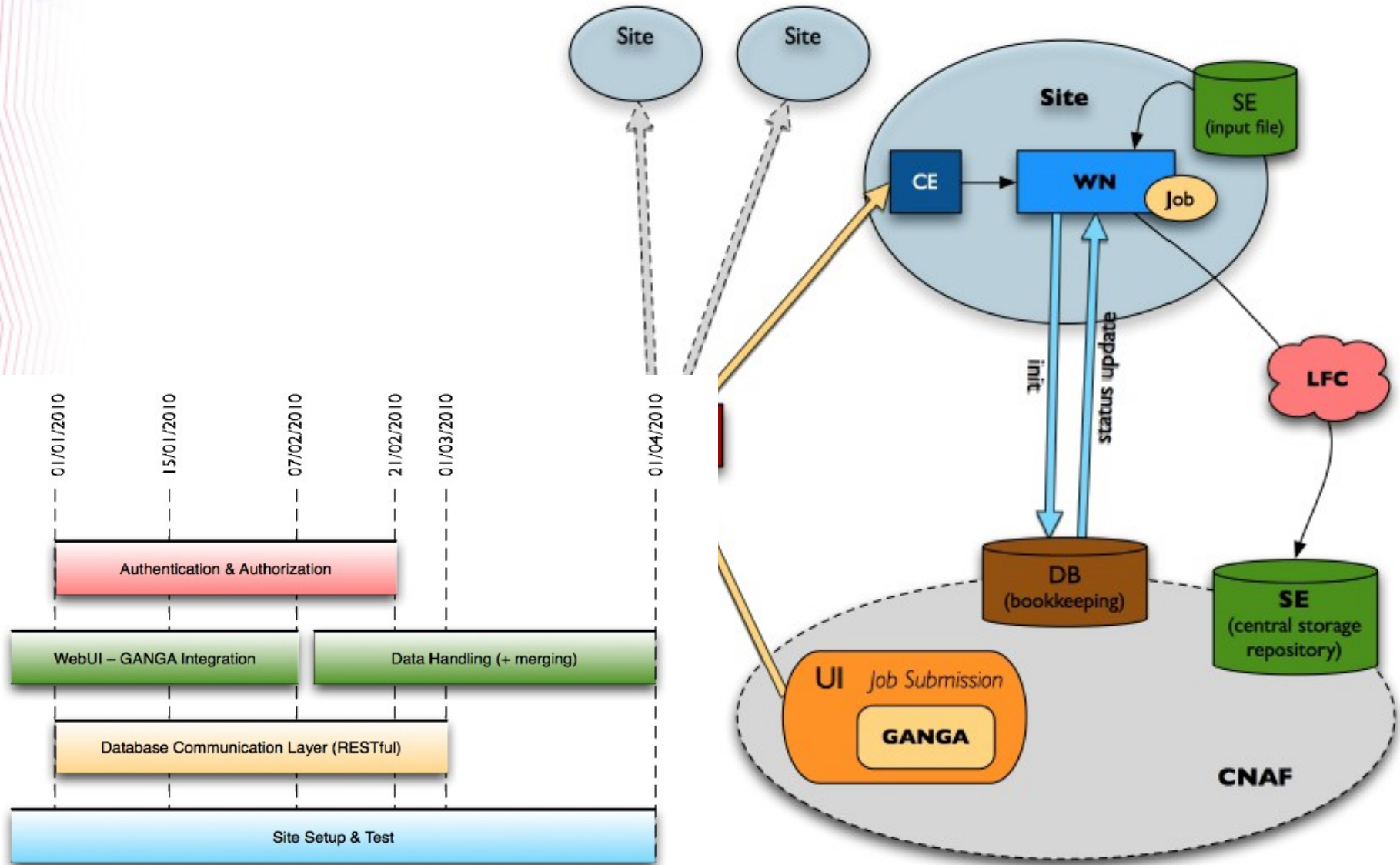
Alberto Ciampa, Enrico Mazzoni, Dario Fabiani

Email list: superb-grid-mng@lists.infn.it

February distrib. prod. interim model



Summer distr. prod. '10 Grid model



Web site progress (I)

– useful content is growing

- calendars
- CDR
- notes
- links to collaboration tools (e.g. wiki)
- list of general meet.
- joining instructions

– multi-language management implemented

- only for public section
- translation of text is in progress

The screenshot shows the SuperB website interface. At the top is a banner with the text "SuperB - A Super" and "WELCOME". Below the banner is a navigation menu with links: Home, Project Office, Accelerator, Detector, Computing, Infrastructure, Physics. On the left side, there is a list of links: Cos'è SuperB, Chi siamo, News, Contatti, Project organization, General meetings, How to join us, Events table, SuperB Calendar, Collaborative tools, Mailing lists, CDR, and Web links. Below this is a section titled "SuperB documents" with "Add Entry" and "Search" options. On the right side, there is a calendar for March 2010. The calendar shows dates from 1 to 31. On March 15, there is a "Management Meeting" event. On March 16, there is a "General Meeting (LAPP - Anecny)" event. On March 20, there is a "Project Board" event. The calendar also has tabs for "Today", "March 2010", "Week", "Month", and "Agenda".

web.infn.it/superb

R. Chiaratti, L. Lilli

Web site progress (II)

General guidelines

If you are evaluating the possibility of getting involved with the SuperB project, we invite you to contact the Project Leader office or the coordinators of the Project divisions.

If you then decide that:

- registered;
 - 117 members
 - 57 inst.
 - registration gives access to the wiki
 - access to svn is now limited to “code developers”
 - will have to be extended
- you have only a generic professional interest in the SuperB scientific adventure and would like to be informed of the major events regarding the project, you can ask to be included in the general mailing list using [this](#) E-mail message template (just replace the place holders in the subject line with your name);
 - you would like to become a SuperB project member with access to the SuperB collaborative tools, you should inform the contact person at your Institution and fill the [membership form](#).

SuperB Collaborative Tools

Please find below a list of the Collaborative tools available to the SuperB group with some instructions:

- [SuperB web site](#)
- [Mailing list service \(Sympa\)](#)
- [Meeting organizer \(Indico\)](#)
- [Phone conference system \(based on a VoIP box located at CNAF\)](#)
- [Audio/Video conference and desktop sharing system \(EVO\)](#)
- [Wiki \(MediaWiki\)](#)

Web site progress (II)

- useful content is growing
 - calendars
 - CDR
 - notes
 - links to collaboration tools (e.g. wiki)
- multi-language management implemented
 - only for public section
 - translation of text is in progress

SuperB Collaborative Tools

Please find below a list of the Collaborative tools available to the SuperB g
instructions:

- [SuperB web site](#)
- [Mailing list service \(Sympa\)](#)
- [Meeting organizer \(Indico\)](#)
- [Phone conference system \(based on a VoIP box located at CNAF\)](#)
- [Audio/Video conference and desktop sharing system \(EVO\)](#)
- [Wiki \(MediaWiki\)](#)

SuperB Workshop R&D

Main goals:

- come to the WS with a **list of proposed issues**
 - topics we need to address for being in a position to develop the SuperB computing model in 2011 (Computing TDR)
- invite external experts (physicists and comp. professionals) interested in contributing to the WS
 - and hopefully to the R&D program as well
- leave the WS with an **R&D program proposal to be finalized in the following weeks**
 - prioritized list of R&D activities
 - quantification of benefits wherever possible
 - estimation of manpower needed and timescale
 - definition of responsibilities for those activities that can be started immediately
 - strategy for dissemination

SuperB Computing R&D Workshop

- site: **Ferrara** is our best option at the moment
 - it's close to Bologna airport (40 Km),
 - cheap hotels, good food, few cars and many bikes on the streets
 - Univ. conference center available basically free of charge
 - can count on experienced local organizers
- Tue. March 9 (2pm) to Fri. March 12 (5pm)
 - right before the Annecy general meeting
 - was last week of Feb. but we discovered a conflict with ACAT 2010 conf.
 - tentative layout:
 - **initial plenary session** to get started
 - **four slots** of plenary sessions; presentations concentrated on those issues that require more detailed study
 - **one slot** per day for personal work
 - **four slots** of two to three parallel sessions
 - **two slots** for the final plenary sessions

Workshop follow-up

- Writing the **second white paper** describing the R&D program
- Presenting the program to the SuperB collab.
- Scheduling:
 - a **mid-way WS** after ~ 6 months
 - a **final WS** after ~ 1 year
- Publicize it for getting **new collaborators**
 - presentation to conferences, seminars, in main laboratories, etc.
 - not only among physicists but also in computing science communities

Conclusions

- Computing support for TDR is growing in scope and size
- Distributed production will be the coming big next step
 - large “worldwide” effort
 - it's important that we get the most out of the exercise
 - plan keeping into account the mid-January deadline for new code and detector geometries
 - help in providing manpower to operate the production
- Time is come for planning the R&D that we want to get started in 2010
 - if you are aware of physicists and computing professionals, individuals and groups, that may be interested in participating, let us know