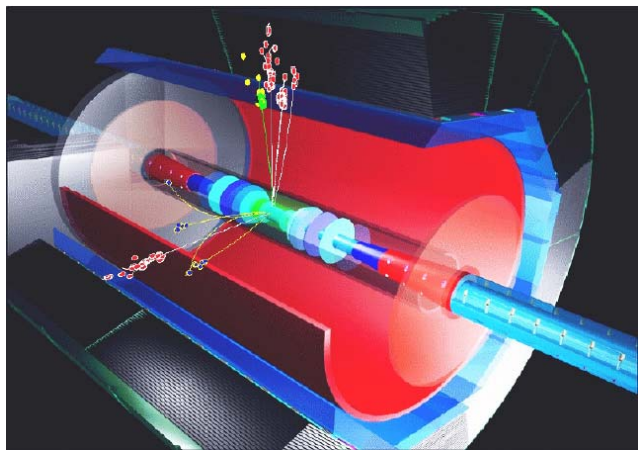
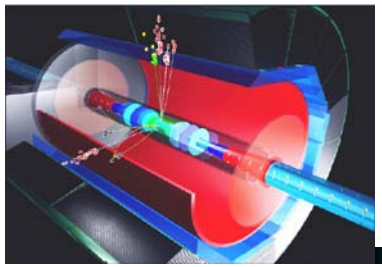


Testbeams at CERN and DESY

Felix Sefkow
DESY

ALCPG workshop at Snowmass
August 22, 2005



This talk

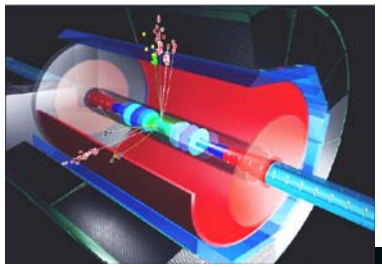
CERN:

- Facilities presented in detail at LCWS04 (Paris)
- Here: update on availability and prospects, on behalf of M. Hauschild (CERN) - thanks for the slides!

DESY:

- Also presented at LCWS04
- Availability: continuous, unchanged
- Here: prospects for improved infrastructure

IHEP (Protvino): nothing new



Test beams at CERN

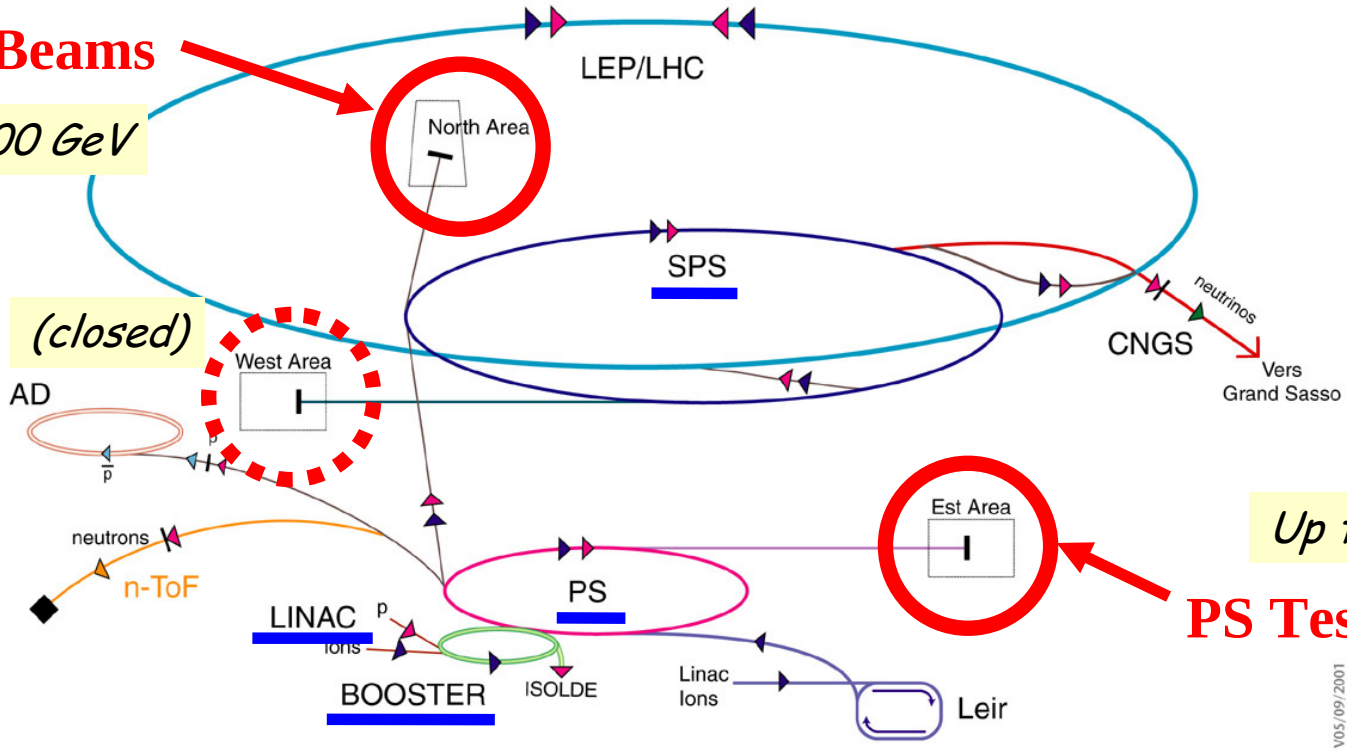
Accelerator chain of CERN (operating or approved projects)

not to scale

SPS Test Beams

Up to 400 GeV

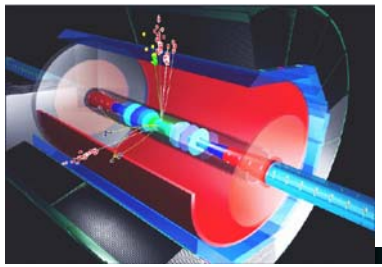
(closed)



Up to 15 GeV

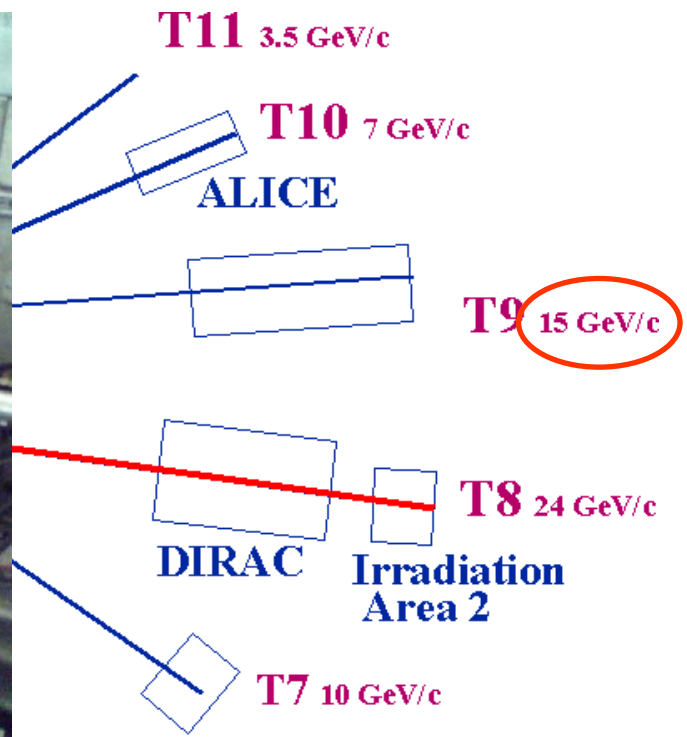
PS Test Beams

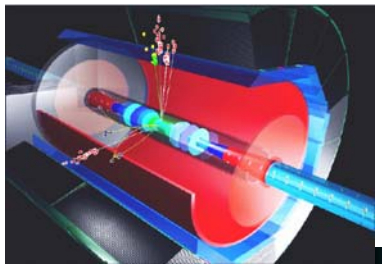
CERN AC_HF205_V05/09/2001



PS beam lines in the East Hall

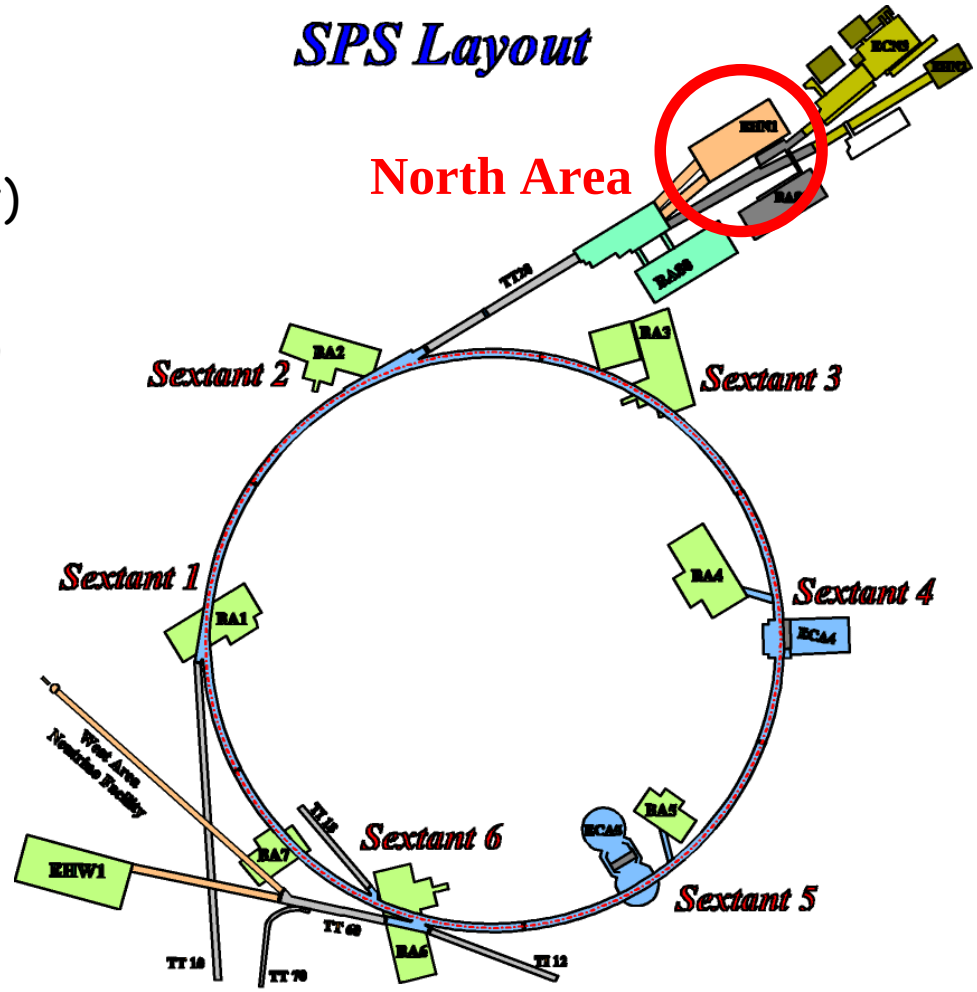
- Electrons, hadrons, muons (up to 1-2 * 10^6 / spill)
- 2 spills of 400 ms, every 16.8s
- Minimum momenta 1 GeV, maximum up to 15 GeV

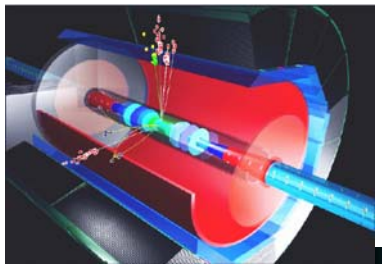




SPS Layout

- SPS beam energy:
  - 400 GeV/c (450 GeV/c max)
- Spill (at 400 GeV/c):
  - 4.8 s spill length (at 400 GeV/c)
  - 1 spill every 16.8 s
- Beam extraction to:
  - North Area (Prevessin site)
    - physics + test beams
  - West Area (Meyrin site)
    - closed end of 2004

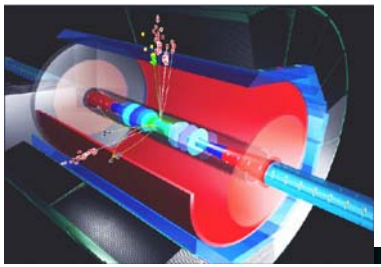




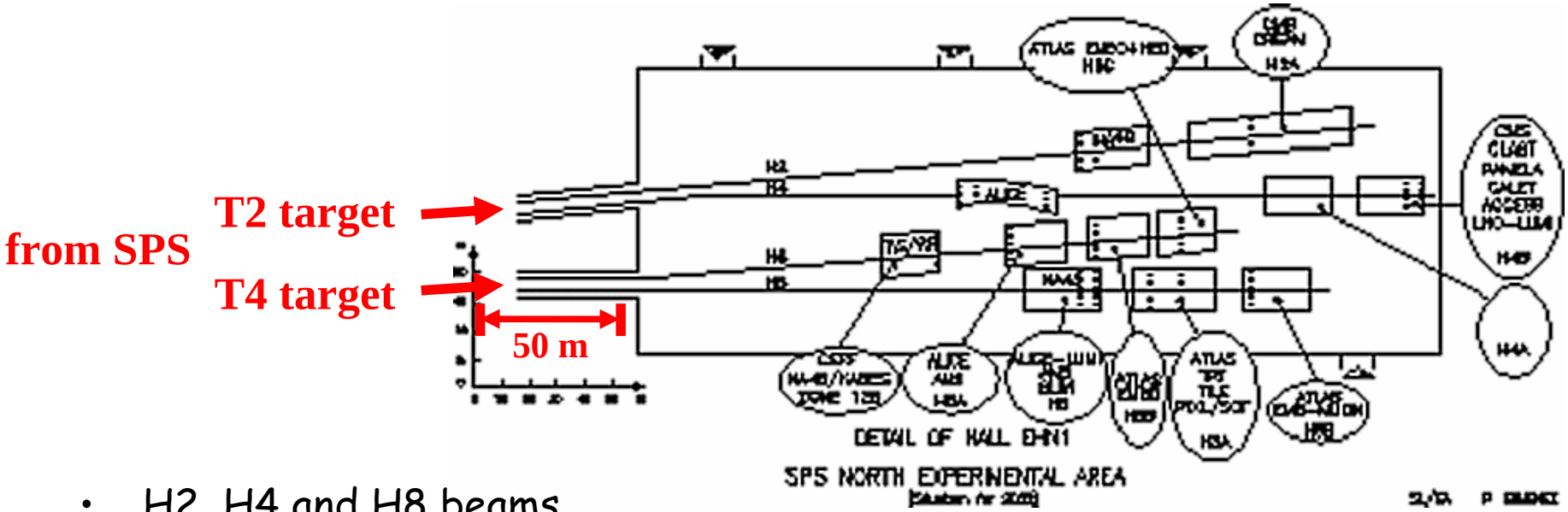
Spills and rates

- Typical calorimetric testbeam user: collect up to 10^8 events within weeks (10^6 s) -> average rate of order 100 Hz

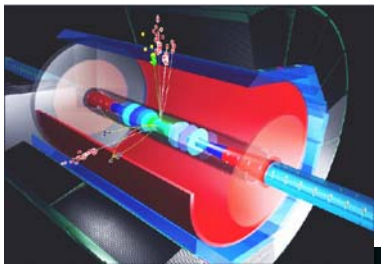
• Assume 4s spill	every 16s	or every 120 s
• Required instant. Rate	400 Hz	3 kHz
• Required buffer depth	1600 events	12'000 events
• Average rate with 2000 ev limited buffer depth	100 Hz	17 Hz
• Average rate with 100Hz limited input rate (e.g. RPC)	25Hz	3 Hz



SPS North Area

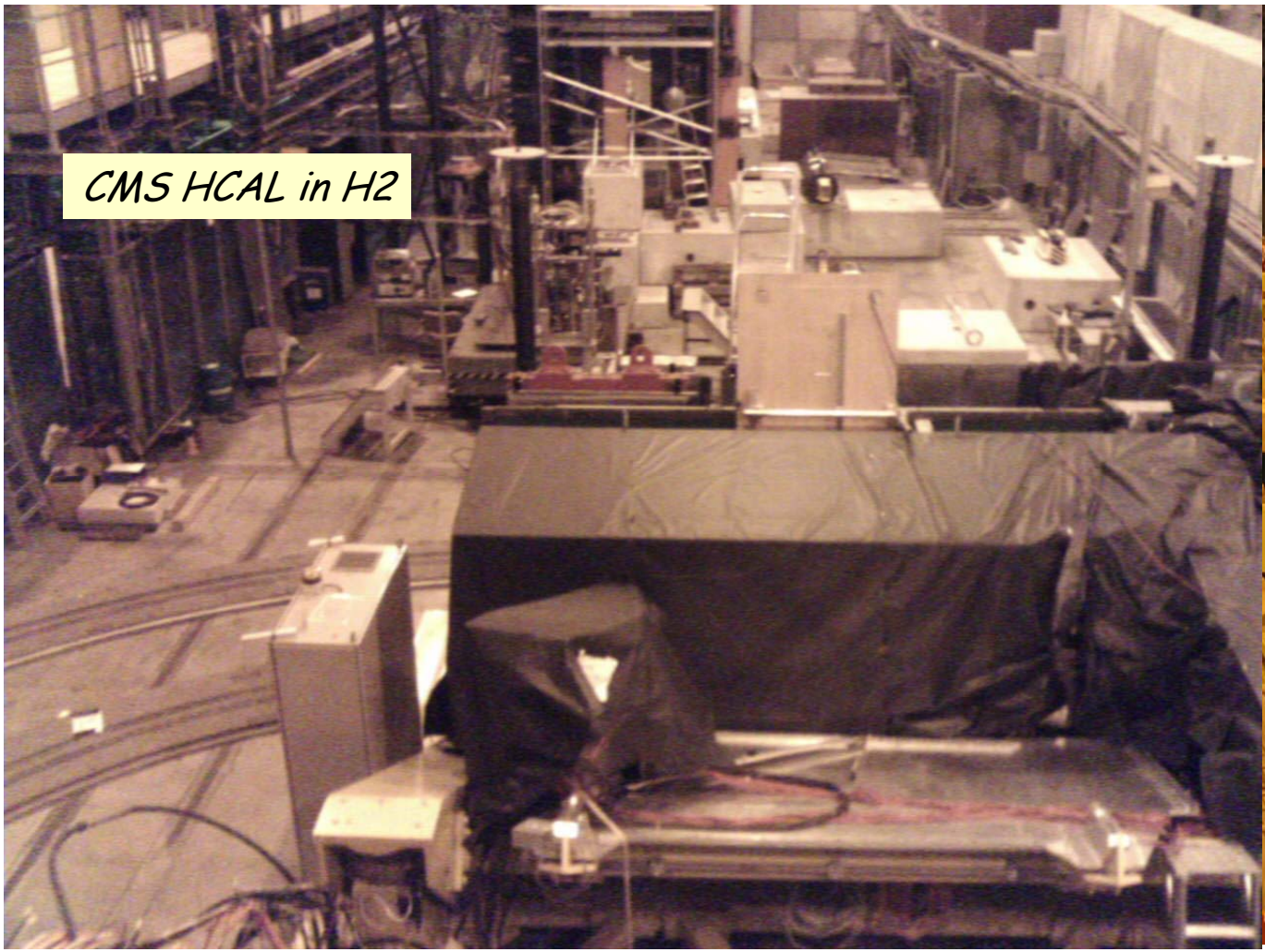


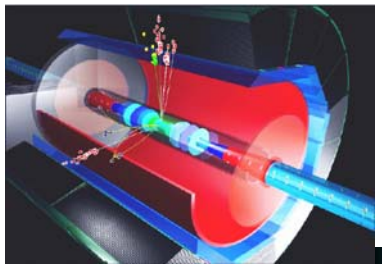
- H2, H4 and H8 beams
  - 10 - 400 GeV/c, up to 10^8 particles/spill (π^+)
  - H4 can be set-up for very clean electron beam (up to ~300 GeV/c)
  - H2 and H8 also have low energy tertiary beams (2 – 10 GeV/c)
- H6 beam
  - 5 – 205 GeV/c, up to 10^8 particles/spill (π^+) (at 5 GeV ~1000 particles / spill)
- Up to 3 experimental areas per beam line (parasitic muon runs possible)



North Area

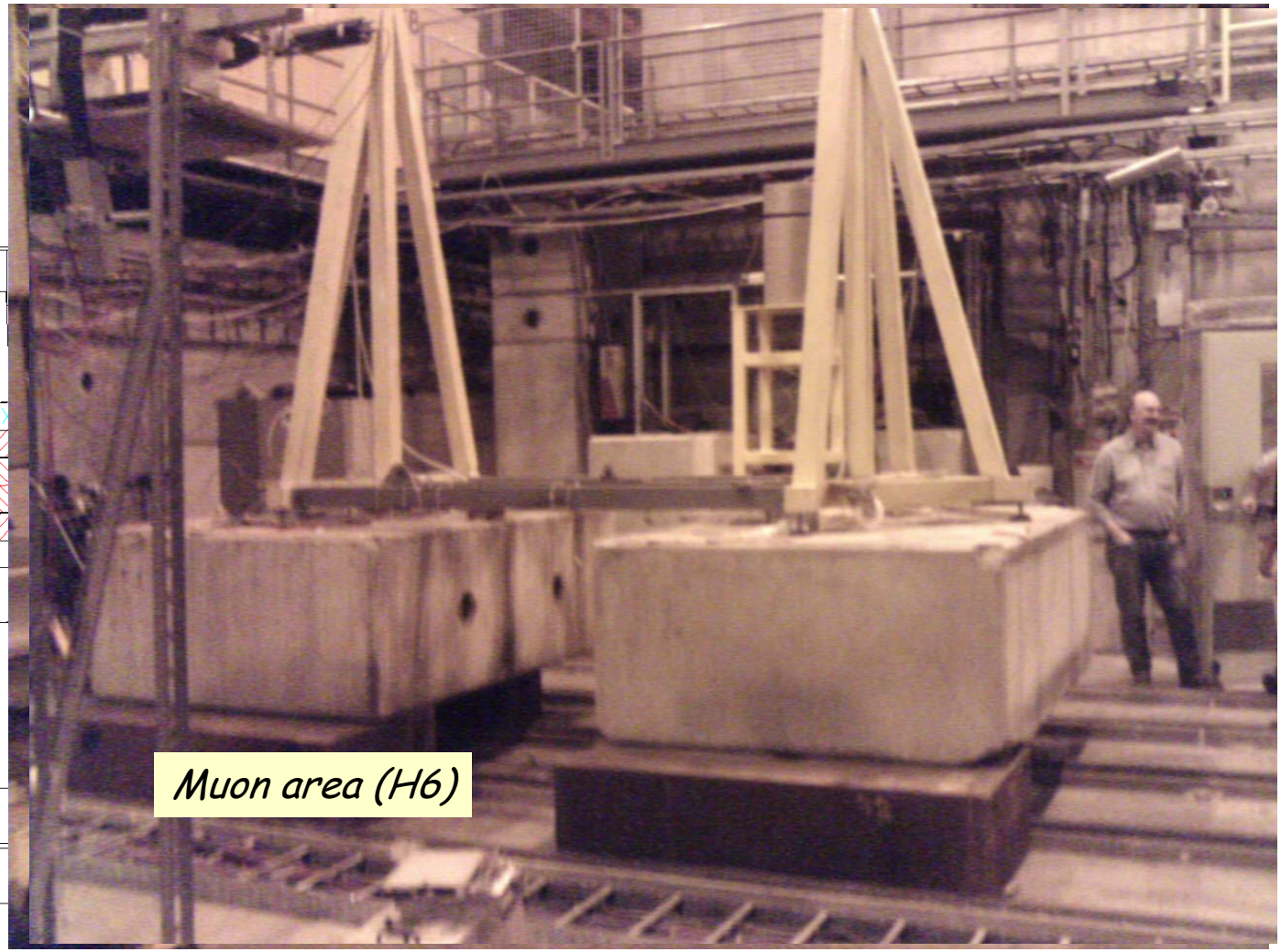
CMS HCAL in H2

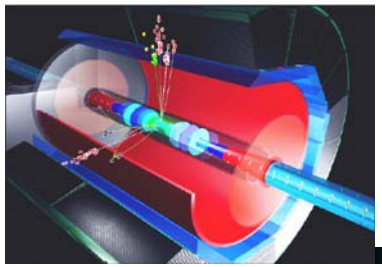




H6 beamline

5-100 GeV
Electrons "not bad"

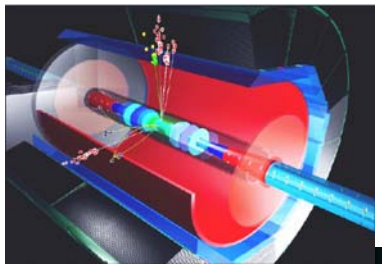




Support by CERN
(all free of charge)

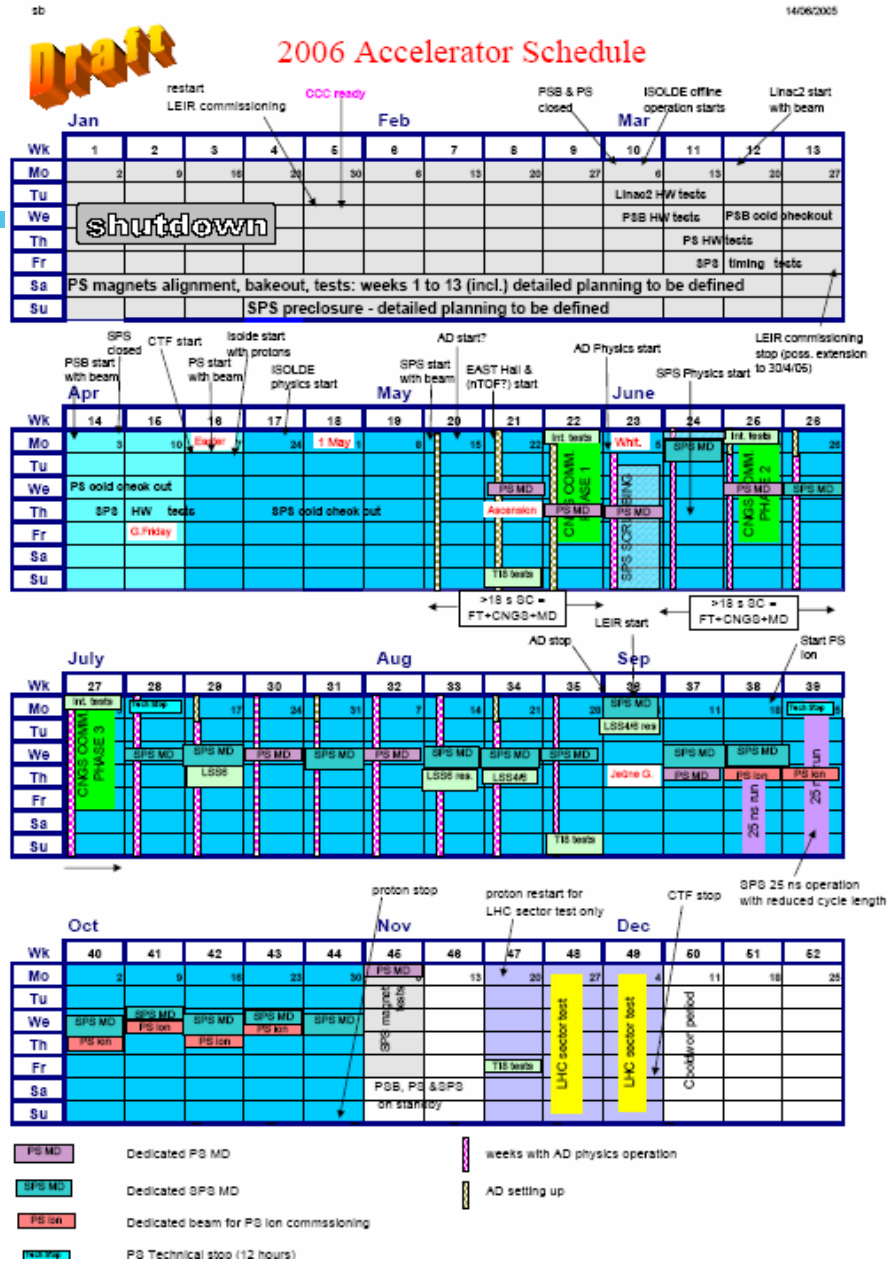
- Basic installation support
  - electronics hut with beam control terminal
  - computer network connection
  - crane usage (with operator)
- Assistance for beam tuning and operation
  - provision of beam position monitors
    - MWPCs in PS East Hall
    - Delay wire chambers and wire filament scanners at SPS (higher accuracy)
  - provision of (threshold) Čerenkov counter(s)
    - usally 1 counter available per beam line, 2 can be requested
    - also more sophisticated differential Čerenkov counters (CEDAR) available at SPS (but tricky to commission and to operate, only on STRONG request)
- Storage space: sparse, but situation gradually relaxing

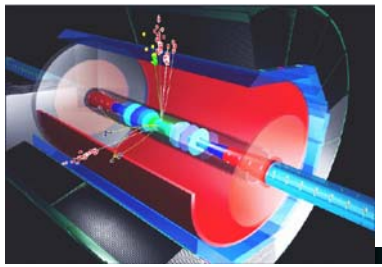
Can also run in single event mode



SPS and PS schedules

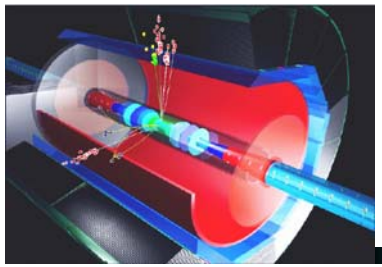
- Almost final (to be approved Sep 1, changes unlikely)
- **PS:**
  mid May - beg November
- **SPS:**
  mid June – beg September
- No longer (>1-2d) interruptions





Availability 2006

- Call for requests in September, schedule in November
  - Availability at present only educated guesswork
- First months (mid June – end August): usage by LHC experiment
- Later reduced demand, except
  - H4 (CMS ECAL calibration all year)
  - H2 (also CMS, up to September or longer)
- Better prospects in H6, H8
  - H8 has quite extensive cryogenic installations (ATLAS LAr)
  - H6 seems a good bet for September / October

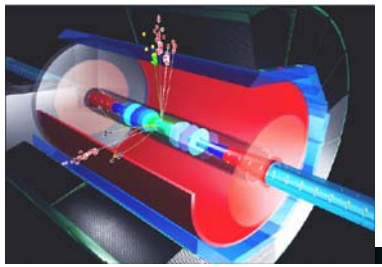


Prospects 2007 and beyond

- Testbeams are foreseen for 2007.
- Start not yet clear, possibly May
  - Later if LHC sector test (Nov 2006) postponed

- CERN Gran Sasso neutrino beam (CNGS): 2 schemes:
  - Normal, maybe somewhat longer spill, longer break (~30s)
  - Or dedicated runs; would imply shorter testbeam period than 2006

- LHC (July 2007 onwards acc. to present planning)
  - No testbeams during LHC filling and set-up
  - Expect about 50% non-availability
    - Average, could be intervals of 15 min – or many hours
  - LHC has absolute priority
  - Should improve in 2008 with better routine operation

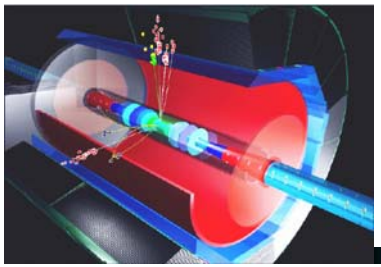


Dates, Contacts, Links

- For runs of more than 1 (2) weeks at the SPS (PS) need to present a proposal to SPSCommittee
  - Next meetings — Sept 27, Nov 15
  - Decision at Research Board, next: Dec 1

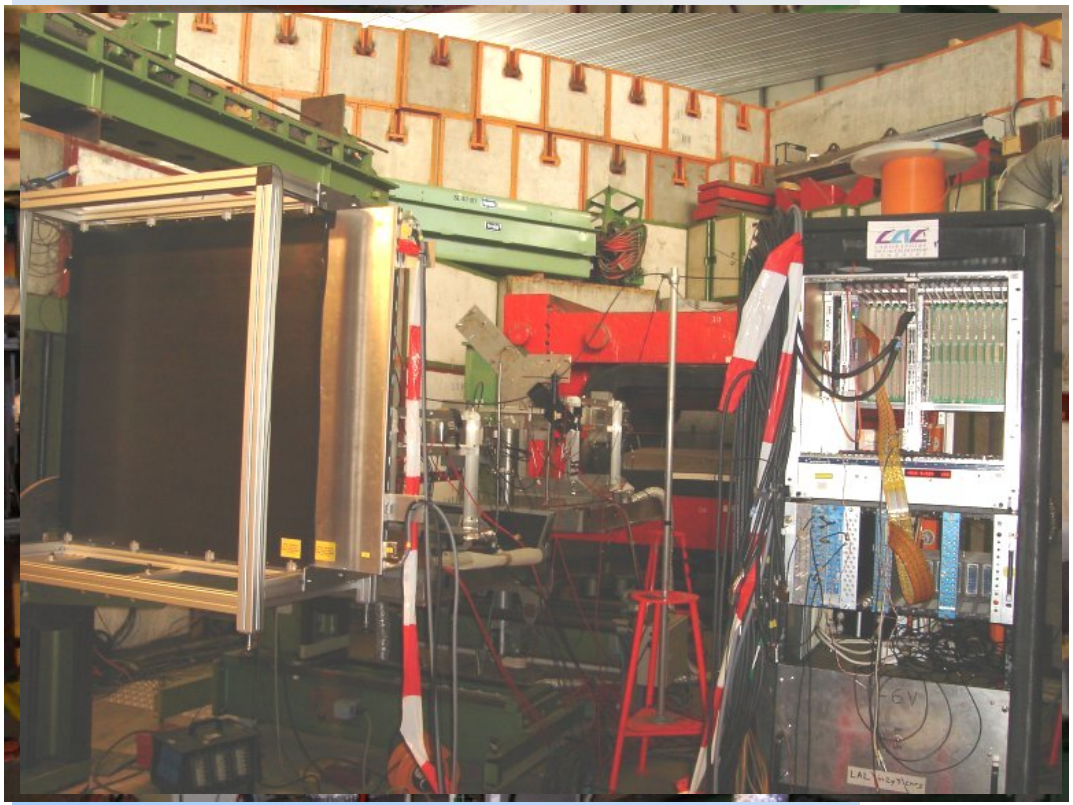
- New Testbeam Coordinator: Christoph Rembser
- SPS beamline physicist: Ilias Eftymiopoulos

- More information
  - PS Users:
    http://ps-schedule.web.cern.ch/ps-schedule/
  - SPS Users:
    http://sps-schedule.web.cern.ch/sps-schedule/

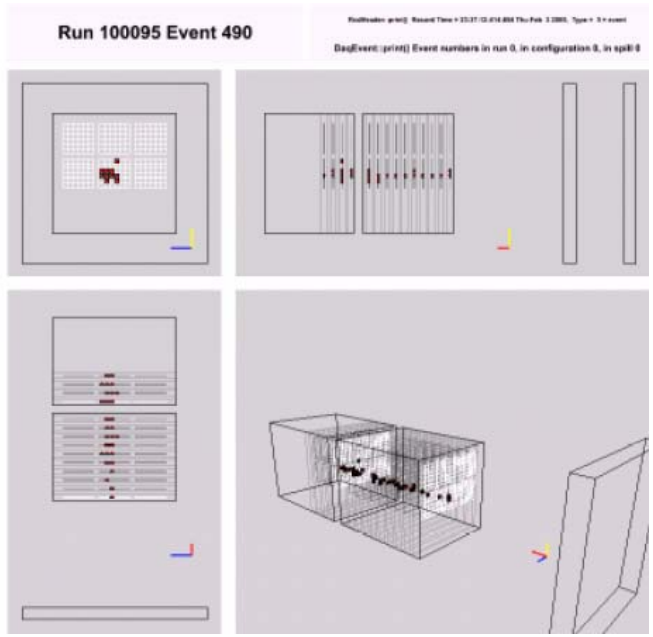


DESY testbeam

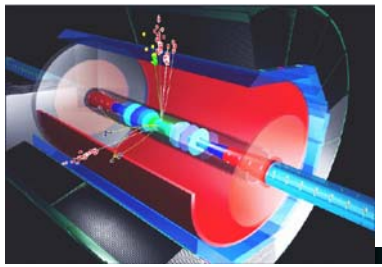
- 1-6 GeV electrons, 0.3-1 kHz, almost all year



Presently commissioning first HCAL modules

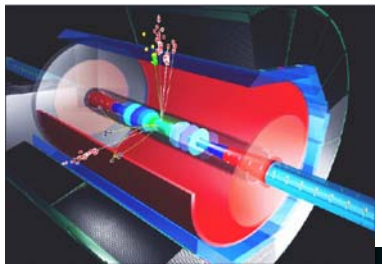


More info at:
http://desyntwww.desy.de/~testbeam/ and Norbert.Meyners@desy.de



European network for detector R&D

- Integrated Infrastructure Initiative within European Union Framework Program 6
- Successfully evaluated, negotiations invited
- Starts presumably in 2006
- Funding volume: 7 M€ for 4 years



EUDET Participants

Participants:

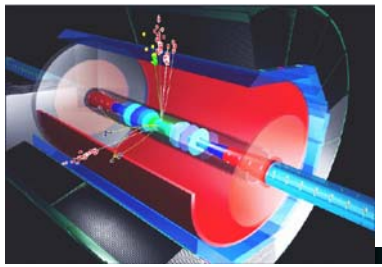
- 25 institutes: from DESY, German U, Poland, France, Spain, Czech, Netherlands, Finland, Israel, UK, Sweden, Switzerland

Associated:

further institutes from Japan, Russia and UK

Coordinating institute DESY

I3 Coordinator: Joachim Mnich



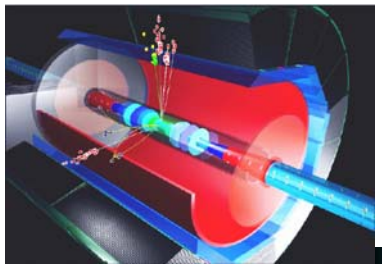
EUDET Goals, Activities

Goals

- establish a European network for detector R&D
- improve **infrastructure for** detector R&D
- provide access to broader community
  - outside EUDET, outside Europe

Joint Research Activities (infrastructure for future R&D)

- Testbeam: Magnet 1.5 T, 86cm bore, pixel telescope (MAPS)
- Tracking: TPC general purpose field cage, Si based endplate, Si tracking facility
- Calorimetry: ECAL / HCAL structure improvements, general purpose electronics, forward detector development facilities
- Support for common analysis and simulation framework



Conclusions

- CERN testbeams are operational in 2006:
  Window of availability opening up in fall

- DESY e testbeams continuously available and in use

- EUDET infrastructure for detector R&D initiative:
  Substantial improvements for DESY beams (and elsewhere) in the next years