

Towards a new GIF Facility

Christoph Rembser

6th LHC Radiation Workshop

November 30 2007

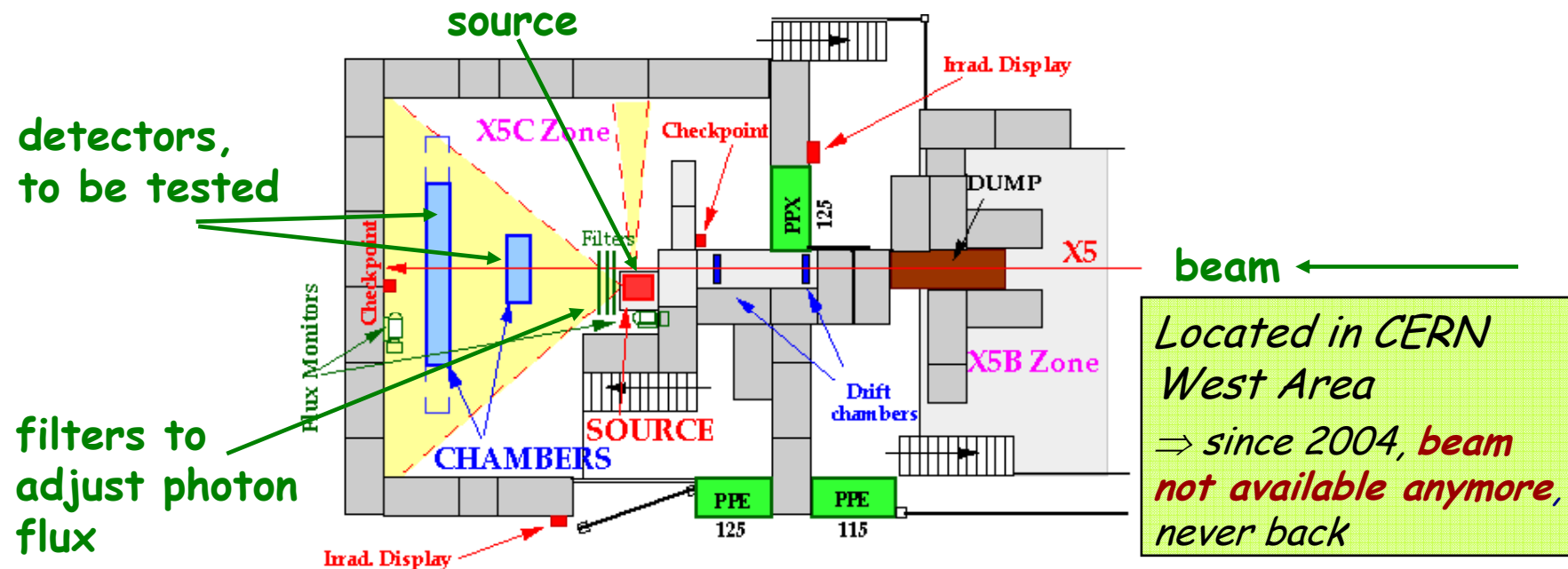
- Description of GIF
→ Goals, strategy, infrastructure, users, schedule...
- Towards a new GIF (GIF++)
→ Requirements & ideas, users, possible schedule...



A MOVING GIF →

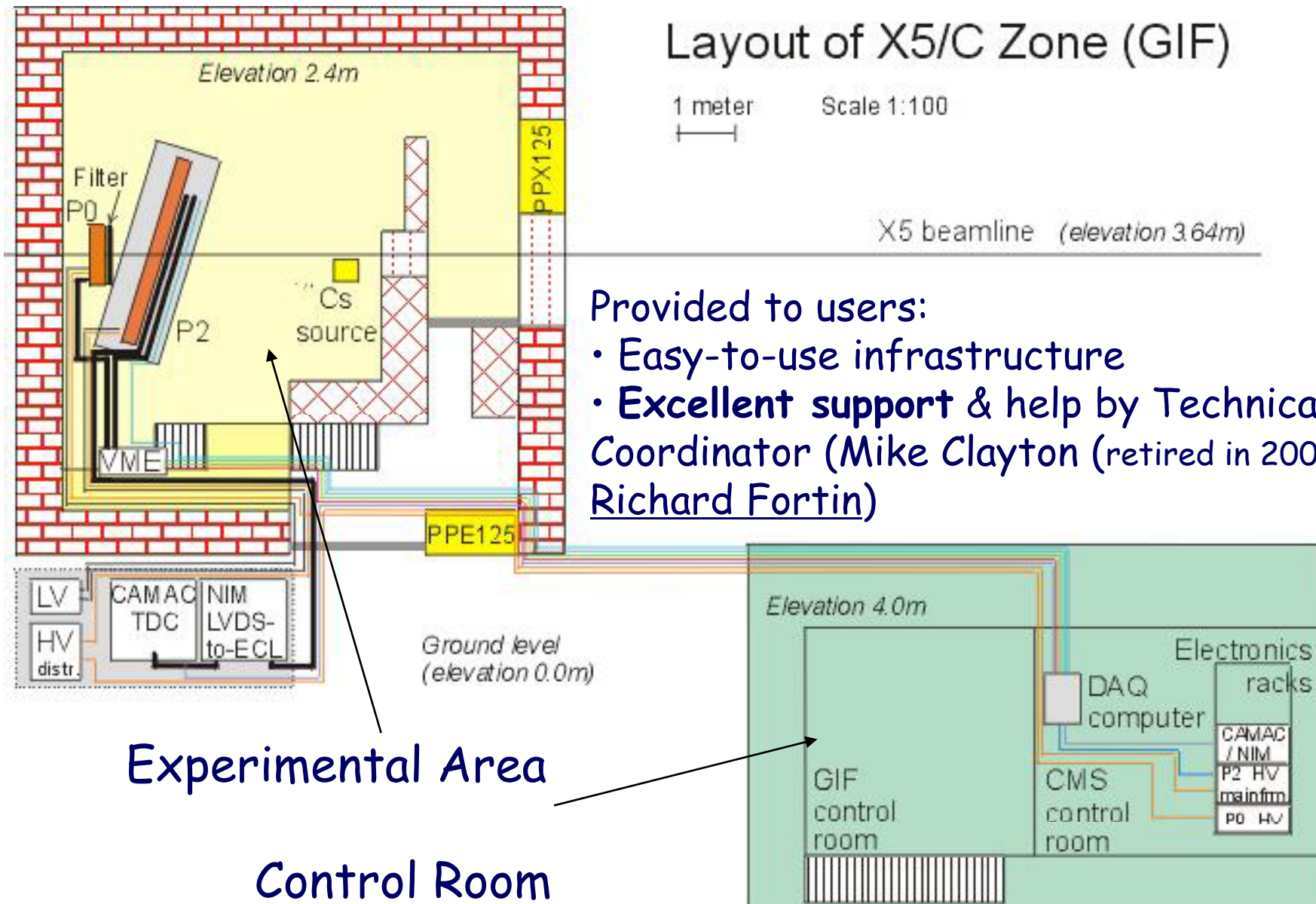
The Gamma Irradiation Facility (GIF)

- Goal: characterisation and commissioning of detectors, studies of detector aging
- Strategy: facility offers combination of a gamma source and particle beams
 - Gamma source Cs^{137} 740GBq (1997) with 662 keV photons, at 50cm 15rad/h
 - electron, pion and muon beams 5 to 250 GeV, 10^6 - 10^7 particles/spill from SPS



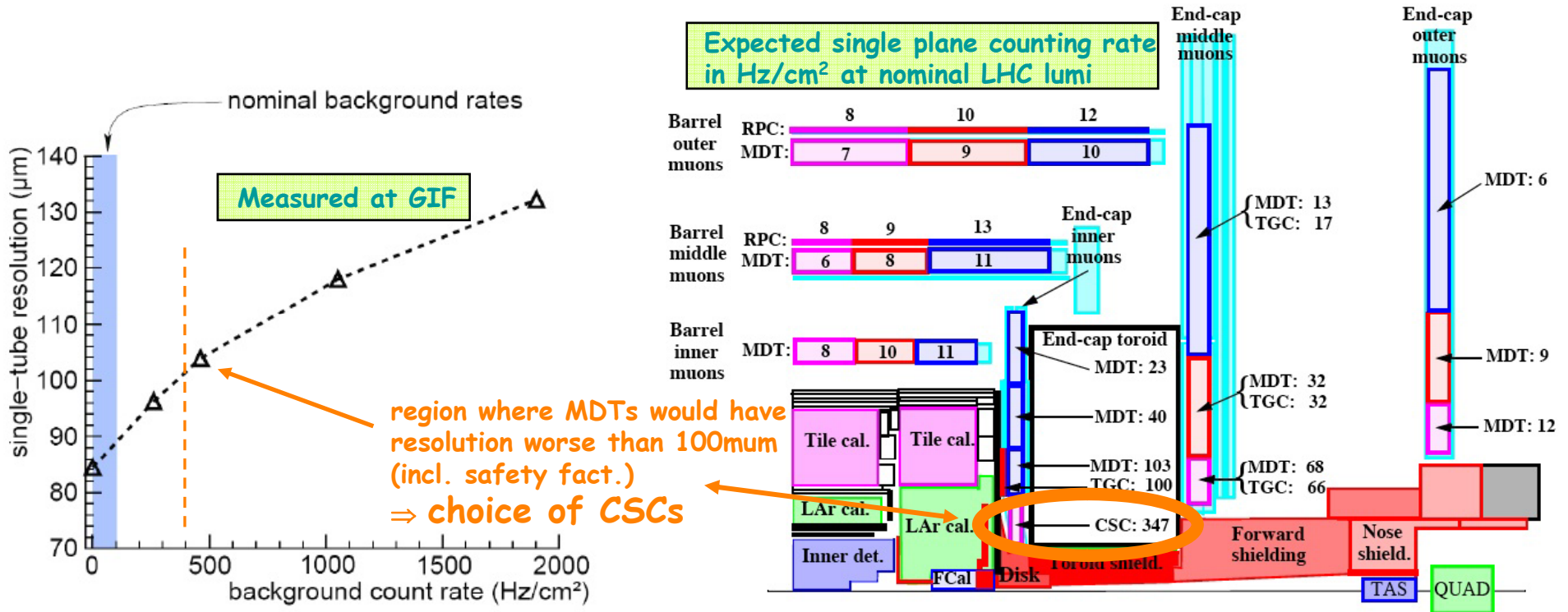
- Commissioned in 1998, since then fully booked, operation during entire year
 - Beam time distribution discussed in user meetings; scheduled by PS/SPS Coordinator (CERN PH)
- Main users: LHC experiments (mainly gas detectors, calorimeters), but also PS/SPS experiments, LHC

GIF: Infrastructure



Example for Tests @ the GIF

- ATLAS Muon Chambers (MDT)
 - Characterisation of detectors, e.g. study of **detector resolution as function of background rate** (gamma source = background, beam = signal)



region where MDTs would have resolution worse than 100μm (incl. safety fact.) ⇒ choice of CSCs

Measurements for MDTs at GIF ⇒ direct impact on detector choice and layout

- Other chambers tested: trigger chambers, RPCs, TRT, crystal calorimeters...

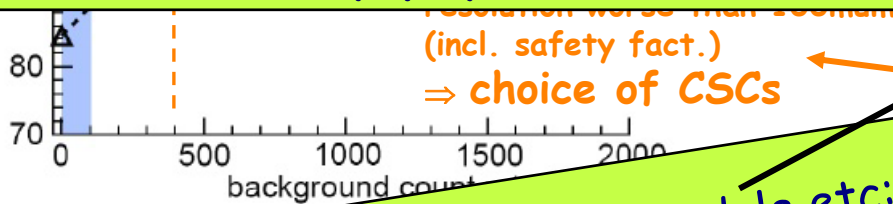
Example for Test

- GIF very popular and active over last 10 years, many publications on GIF results, e.g. in NIM ~190 articles;

Google search

"CERN gamma irradiation facility" (182000) about as many hits as "sexy physicist" (219000)

single-tube resolution (μm)



More details on GIF, GIF schedule etc:
<http://ess.web.cern.ch/ESS/GIFProject/index.html>

- Members tested: trigger chamber calorimeters...

| Expt Id | Experiment | | | | Width | Thickness | Height |
|---------|----------------------|----------------|-----------|--|----------|-----------------------------------|----------|
| 10 | CMS-RPC | | | | 0.600 | 0.800 | 0.600 |
| | 2003-09-24 00h | 2004-05-26 08h | parasitic | Gabriella Pugliese | . | . | . |
| | 2004-05-26 08h | 2004-06-14 08h | main | Ian Crotty 164414 | . | . | . |
| | 2004-06-14 08h | 2004-11-24 00h | parasitic | . | . | . | . |
| 11 | CMS-RPC-RB | | | | 2.800 | 0.700 | 2.700 |
| | 2003-09-24 00h | 2004-08-04 00h | parasitic | Anna Colaleo | . | . | . |
| | 2004-09-29 00h | 2004-11-05 00h | parasitic | null | . | null | . |
| 12 | ATLAS-MDT | | | | 1.900 | 1.000 | 3.000 |
| | 2003-09-24 00h | 2004-05-05 00h | parasitic | Stephanie Zimmermann | . | . | . |
| 13 | ATLAS-RPC | | | | 1.700 | 1.050 | 4.100 |
| | 2003-09-24 00h | 2004-05-17 08h | parasitic | Anna di Ciaccio | . | . | . |
| | 2004-05-17 08h | 2004-05-26 08h | main | . | . | . | . |
| | 2004-05-26 08h | 2004-09-29 08h | parasitic | . | . | . | . |
| | 2004-09-29 08h | 2004-10-11 08h | main | . | . | . | . |
| | 2004-10-11 08h | 2007-06-01 00h | parasitic | A Di Ciaccio | . | . | . |
| 14 | ATLAS-RPC (2) | | | | 0.800 | 0.600 | 0.800 |
| | 2003-09-24 00h | 2004-08-04 00h | parasitic | Anna di Ciaccio | . | . | . |
| 15 | ALICE-RPC | | | | 1.150 | 0.800 | 1.000 |
| | 2003-09-24 00h | 2004-06-14 08h | parasitic | Alfredo Musso | . | . | . |
| | 2004-06-14 08h | 2004-07-01 10h | main | A Musso 163763 | . | . | . |
| | 2004-11-03 08h | 2004-11-15 08h | main | . | . | . | . |
| | 2004-11-15 08h | 2006-12-31 00h | parasitic | A Musso | . | null | . |
| 16 | LHCb-MWPC | | | | 0.500 | 0.200 | 0.500 |
| | 2003-09-24 00h | 2004-07-31 00h | parasitic | Vsevolod Souvorov | . | . | . |
| | 2007-01-01 00h | 2007-08-07 08h | parasitic | Anatoli Kachtchouk | . | . | . |
| | 2007-08-12 08h | 2007-09-18 08h | parasitic | Anatoli Kachtchouk | . | Resume activity | . |
| | 2007-09-19 08h | 2007-12-25 00h | parasitic | Anatoli.Kachtchouk@cern.ch 16-2988 | . | Resume activity after maintenance | . |
| 17 | CMS-RPC-RE | | | | 1.900 | 0.200 | 1.700 |
| | 2003-09-24 00h | 2004-08-04 10h | parasitic | Ian Crotty | . | . | . |
| 18 | Alice TOF | | | | 1.300 | 0.600 | 0.500 |
| | 2004-01-01 00h | 2004-06-09 00h | parasitic | . | . | . | . |
| | 2004-09-07 00h | 2004-09-13 08h | parasitic | Despina Hatzifotiadou | . | . | . |
| | 2004-09-13 08h | 2004-09-22 08h | main | . | . | . | . |
| | 2004-09-22 08h | 2004-10-01 00h | parasitic | . | . | . | . |
| 19 | ATLAS-MDT (Magnet) | | | | 1.300 | 1.400 | 2.000 |
| | 2004-08-04 08h | 2004-08-25 10h | main | . | . | . | . |
| 20 | ESS Radiation test | | | | 0.500 | 0.500 | 1.500 |
| | 2004-07-01 00h | 2004-07-15 00h | parasitic | Paul Maley 71025 | . | . | . |
| 21 | LHCb-MWPC (2) | | | | 1.200 | 0.600 | 1.500 |
| | 2004-07-02 10h | 2004-07-19 08h | main | . | . | . | . |
| 22 | ATLAS-CSC | | | | 1.000 | 0.600 | 1.000 |
| | 2004-07-19 08h | 2004-08-04 08h | main | . | . | . | . |
| | 2004-08-04 08h | 2004-08-15 00h | parasitic | . | . | . | . |
| | Alice-AMS | | | | 1.200 | 0.120 | 0.500 |
| | COMPASS | | | | 2.050 | 0.850 | 0.500 |
| | 2005-01-20 00h | 2006-12-20 00h | parasitic | Fulvio Tassarotto | . | . | . |
| | 2007-02-15 00h | 2007-05-01 00h | parasitic | fulvio.tassarotto@rieste.infn.it 16-4826 | . | null | . |
| | ATLAS TGC | | | | 9999.000 | 9999.000 | 9999.000 |
| | 2005-03-30 00h | 2005-04-30 00h | parasitic | Masaya Ishino | . | . | . |
| 26 | Alice CPC | | | | 0.500 | 0.900 | 4.000 |
| | 2005-06-27 00h | 2005-07-31 00h | parasitic | Christian Finck | . | . | . |
| 27 | LHC BLM | | | | 1.600 | 0.500 | 0.500 |
| | 2007-08-06 08h | 2007-08-12 08h | main | Bernd.Dehning@cern.ch 16-3110 | . | Dates set by rfortin 2007-7-12 | . |
| 28 | Totem CSC Aging Test | | | | 1.000 | 0.500 | 1.200 |
| | 2006-12-20 00h | 2007-05-31 00h | parasitic | M. Lo Vetere, E. Robutti | . | . | . |
| | 2007-08-15 12h | 2007-09-15 12h | parasitic | M. Lo Vetere, E. Robutti | . | . | . |
| 29 | MAINTENANCE | | | | 2.000 | 2.000 | 2.000 |
| | 2007-09-18 08h | 2007-09-18 17h | main | Richard.Fortin@cern.ch 16-3726 | . | rfortin 2007-09-17 | . |

Towards a GIF++

- **GIF** facility will come to an **end in June 2008**
 - source "exceeds lifetime" of 10 years (mechanics, safety)
 - area needed for LHC Magnet Repair Facility and LHC experiments clean rooms (Si Tracker upgrades)
 - **For SLHC and detector upgrades, experiments need similar concept with**
 - **stronger source** ($x \sim 10 \Rightarrow O(10\text{GBq})$)
 - **more space** (old: $\sim 16\text{m}^2$ new: $\sim 25\text{m}^2$)
 - **beam** (high energy, $O(100\text{GeV})$)
- ⇒ possible solution: GIF++ @ SPS North Area
(currently under discussion in **collaboration** between Users, CERN teams from Physics Department, Accelerators, Experimental Areas, Safety and other support groups)
- ⇒ Planning and **Users Meeting**: Fri Dec 14 2007 10:00 - 12:00
- ⇒ Agenda, to be discussed in this meeting: tasks & action list for possible **milestones**
- ⇒ Design Report March 2008
 - ⇒ Dismantling of old GIF start Jul 2008
 - ⇒ Construction of GIF++ in 2009
 - ⇒ Commissioning of GIF++ in 2010

You are welcome to join!!!

Towards a GIF++

- **GIF** facility will come to an **end in June 2008**
 - source "exceed lifetime" of 10 years (mechanics, safety)
 - area needed for **Fast Repair Facility** and LHC experiments clean rooms (Si Tracker upgrade)

- **For SLHC and LHC experiments need similar concept with**
 - **stronger** source
 - **more space**
 - **beam** (high energy)

CR Comment: with start of LHC, we can expect urgent questions on detector/equipment features and effects which need to be addressed a.s.a.p.!

⇒ possible solution: **GIF++ @ SPS** (currently under discussion in **Physics Department, Accelerators, Experiments, Safety and other support groups**)

⇒ **Planning and Users Meeting: Fri Dec 14 2007 10:00 - 12:00**

⇒ **Agenda, to be discussed in this meeting: tasks & action list for possible milestones**

- ⇒ Design Report March 2008
- ⇒ Dismantling of old GIF start Jul 2008
- ⇒ Construction of GIF++ in 2009
- ⇒ Commissioning of GIF++ in 2010

you are welcome to join!!!