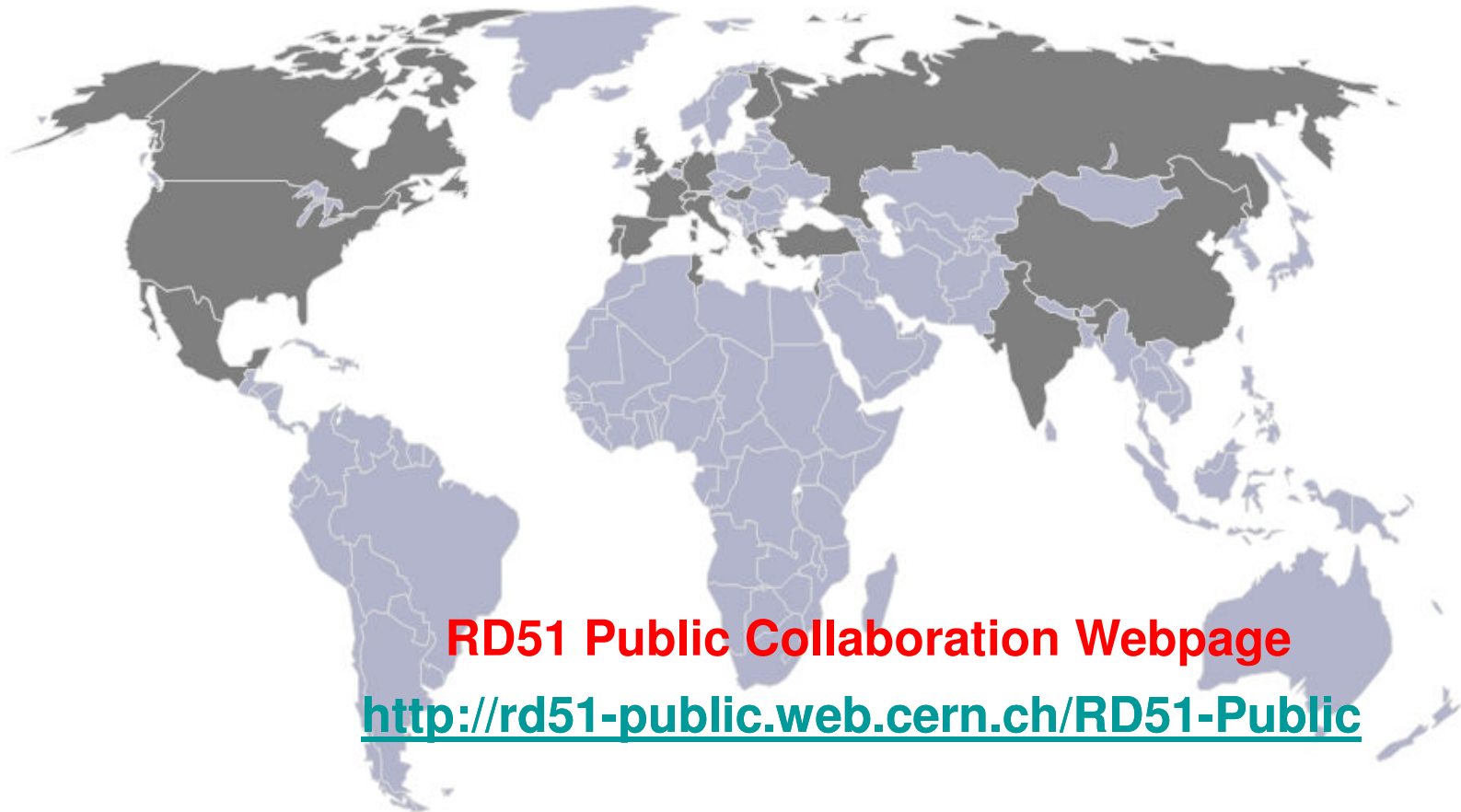


RD 51 Collaboration News

Leszek Ropelewski (CERN), Maxim Titov (CEA Saclay)



RD51 Public Collaboration Webpage
<http://rd51-public.web.cern.ch/RD51-Public>

4th RD51 Collaboration Meeting, CERN, November 23-25, 2009

News since the last RD51 Collaboration Meeting

- **CERN, June 22, 2009:**

Prof. Bikash Sinha, Director of SINP & VECC and Prof. Sergio Bertolucci, CERN Director for Research and Computing, sign a RD51 MOU

→ Followed by the first discussion between CERN Management & RD51 spokespersons about CERN EN/ICE Workshop upgrade



<http://cdsweb.cern.ch/journal/CERNBulletin/2009/30/News%20Articles/1190788?In=en>

- **RD51 mini-week, CERN, September 23-25, 2009:**

<http://indico.cern.ch/conferenceDisplay.py?confId=66175>

- **RD51 test-beam H4@SPS, October 22 – November 2, 2009 (5 groups)**

- **CERN/MPGD Workshop Upgrade (Meeting with CERN Management, Nov. 19,2009)**

RD51 LHCC Reviews / Annual Report

Meeting with LHCC Referee (July 2, 2009):

<http://indico.cern.ch/conferenceDisplay.py?confId=63950>

- **LHCC Meeting on Nov. 11,12, 2009 has been cancelled**
- **RD51 Report in the LHCC Open Session is planned for Feb. 17, 2010**

RD51 Annual Report 2009 :

- **technical description of the common projects in the WG;**
- **summary of scientific results in the WG.**

No plans to put updates on tasks/milestones - it will be a short (~ 5 pages per WG) SCIENTIFIC SUMMARY of the RD51 activities.

- **Draft version is planned to be distributed in the beginning of December**
- **Final version of the annual report ready by the end of the 2009**

RD51 Internal Collaboration Notes

<https://espace.cern.ch/test-RD51/RD51%20internal%20notes/Forms/AllItems.aspx>
(CERN userID or email and NICE password are required to access internal notes)

- RD51-2009-001: S. Mukhopadhyay et al., “neBEM: a Field Solver”
- RD51-2009-002: M. Capeans et al., “About aging of gas detectors: a compilation of some validation studies carried out for LHC”
- RD51-2009-003: S. Duarte Pinto, “RD51, an R&D Collaboration for Micropattern Gaseous Detectors”
- RD51-2009-004: P. Fonte, V. Peskov, “Summary of what is known about discharges in MPGDs and what will be important to study in the frame of WG2 of the RD51”
- RD51-2009-005: R. Veenhof, “Numerical methods in the simulation of gas-based detectors”
- RD51-2009-006: H. van der Graaf, F. Hartjes, “Performance and prospects of GridPix and Gossip detectors”
- RD51-2009-007: V. Razin et al., “RETGEM with polyvinylchloride (PVC) electrodes”

New notes since last RD51
collaboration meeting in Crete

RD51 Conference Presentations / Publications

RD51 Conference Presentations (talks on behalf of the RD51 – should be approved by the RD51 MB):

- **Serge Duarto Pinto, Talk at the the XLVII International Winter Meeting on Nuclear Physics, Bormio, Jan. 26-30, 2009,**

<http://rd51-public.web.cern.ch/RD51-Public/Documents/ConferenceContributions/090128Bormio.pdf>

- **Gabriele Groci, Talk at the 11th ICATPP Conference on Astroparticle, Particle, Space Physics, Detectors and Medical Physics Applications Instrumentation,(Villa Olmo, Como Oct. 5-9, 2009,**

http://villaolmo.mib.infn.it/presentations/Sala%20Ovale/Tuesday/VillaOlmo2009Talk_Groci.ppt

RD51 Publication (on behalf of the RD51):

Serge Duarte Pinto, <http://arxiv.org/abs/0907.2673>, Proceedings of the XLVII International Winter Meeting on Nuclear Physics, Bormio, Jan. 26-30, 2009

Gabriele Groci, Proceedings of the Como Conference, Oct. 5-9, 2009

http://villaolmo.mib.infn.it/ICATPP11th_2009/accepted/Tracking%20Devices/Croci.pdf

- **Submitted Request for the Poster Contribution at the 2010 Vienna Conference**
- **Principal Targets for 2010 are: LCWS2010, ICHEP2010, IEEE2010 (please contact Andy White)**

RD51 Upgrade Talks / Seminars

“The RD51 Collaboration - Development of Micro-Pattern Gas Detectors Technologies”

October 18th, 2009 (CERN) – “Alice Upgrade Forum” (L. Ropelewski)

<http://indico.cern.ch/conferenceDisplay.py?confId=68125>

- Chicago University Seminar, November 30th, 2009 (M. Titov)
- Fermilab Research Technique Seminar, December 1st, 2009 (M. Titov)
- BNL Instrumentation Division Seminar, December 2nd, 2009 (M. Titov)



We encourage RD51 collaboration members to organize seminars in your laboratory/country (contact RD51 MB – Andy White)

Large Area MPGDs - request from experiments

Atlas - Nigel Hessey
CMS - Jordan Nash
LHCb - Sheldon Stone
ALICE - Paolo Giubellino
TOTEM - Angelo Scribano

PANDA - Bernd Voss
KLOE2 – Giovanni Bencivenni
ILC DHCAL - Jaehoon Yu

...

Please send your inputs

**It will be part of the RD51
annual report**

Potential Interest of the ATLAS Collaboration in the MPGD Technology:

MPGD Technology / Detector upgrade	Total detector size	Timescale
<i>Gridpix (Micromegas/Ingrid + CMOS pixel ASIC)</i>		
B-layer Pixel detector ATLAS TRT	~ 0.2 m ² ~ 5 m ² ~ 100 m ²	2018-2019
<i>Micromegas</i>		
ATLAS Muon System (add chambers to inner ring of a small wheel)	~100 m ² (single module size ~ 1-2 m ²)	2013-2014 (demonstrator prototypes ready in 2010-2011)
ATLAS Muon System (replacement of a small wheel and inner ring of a large wheel)	~ 1000 m ²	2018-2019

Complementary Developments:

Development	Function Required	Timescale
Timepix2 /Gossip CMOS pixel chip	Time information & resolution ~ few ns, external triggering capability, radiation hardness	2011-2013
General purpose electronics chip for ATLAS Muon/Micromegas	Time information, external triggering capability, radiation hardness, integration to long strips (~ 1 m)	2011-2012
Software / MC simulation	Integration of gas detector packages (Garfield, Magboltz) into GEANT4 framework	2010-2011

RD51 Test-Beam Campaign

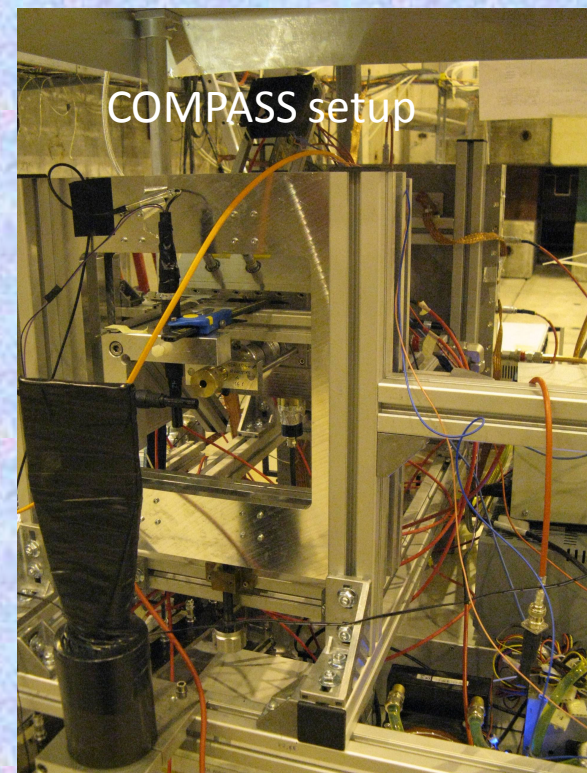
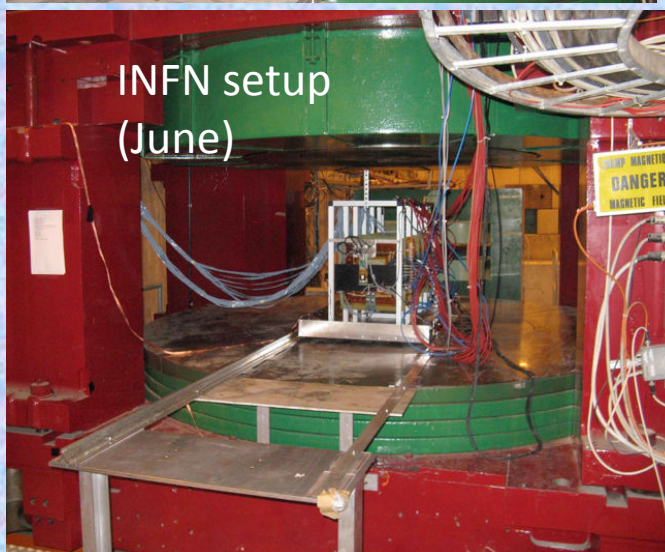
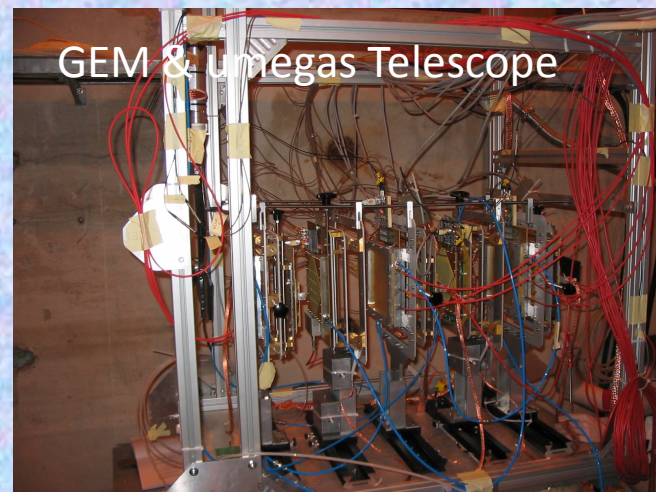
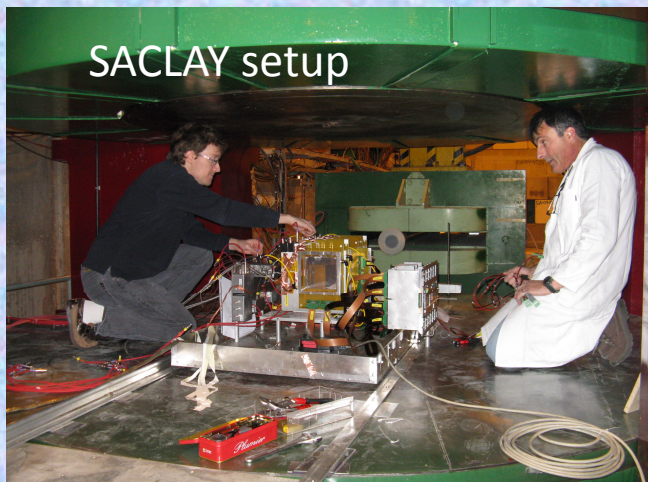
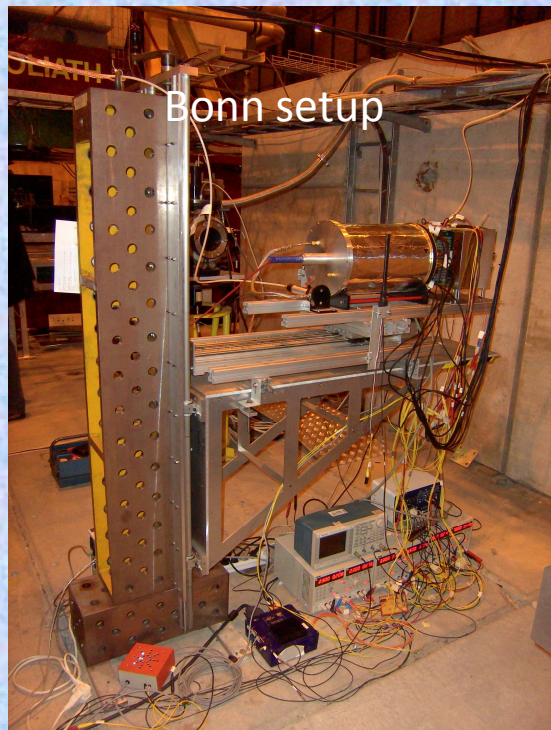
5 RD51 groups have been using simultaneously test-beam (Oct. 22- Nov.2)

Main user & daily meetings to organize access & beam setting

		lowest priority		main user	
Mon	19th Oct				
Tue	20th Oct				
Wed	21st Oct				
Thu	22nd Oct				
	Morning 8 - 16				
	Evening 16 - 24	0			
Fri	23rd Oct				
	Night 24 - 8				
	Morning 8 - 16	0			
	Evening 16 - 24	1A	MM TPC	RES MM	THGEM
Sat	24th Oct				
	Night 24 - 8	1B	Bonn	MM TPC	RES MM
	Morning 8 - 16	1C	CERN	Bonn	MM TPC
	Evening 16 - 24	1D	THGEM	CERN	Bonn
Sun	25th Oct				
	Night 24 - 8	1E	RES MM	THGEM	CERN
	Morning 8 - 16	2A	MM TPC	RES MM	THGEM
	Evening 16 - 24	2B	Bonn	MM TPC	RES MM

Our special thanks goes to Matteo Alfonsi, Yorgos Tsipolitis for an excellent and very smooth organization of the test-beam activities

RD51 Test-Beam Campaign

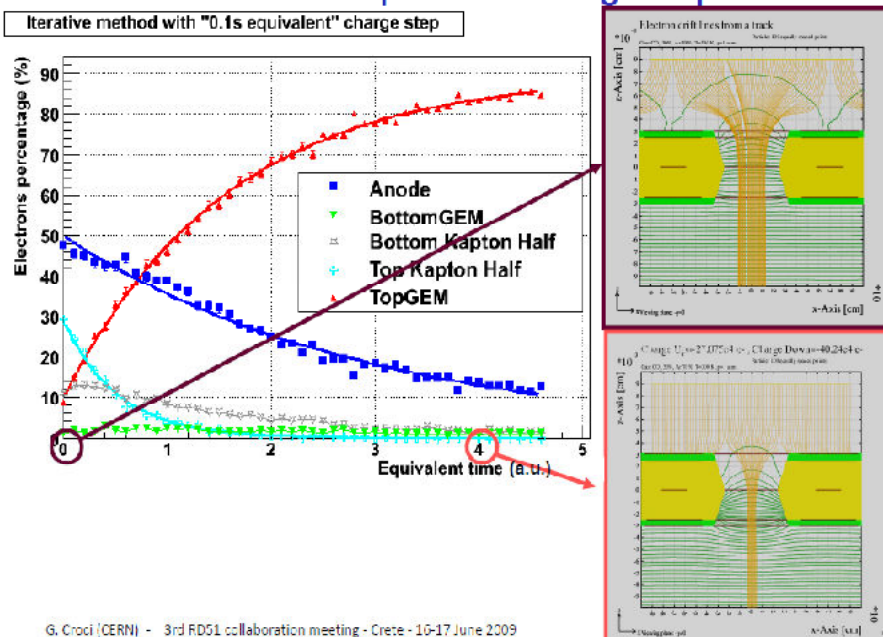


Test beam experience – WG7, Nov. 24 (09:00-13:00)

Please submit your request for 2010 RD51 test-beam before the end of November

GRID for RD51 ?

First “manual” iterative method simulation
with “0.1s equivalent” charge step



Recent developments

The simulation took about 2 weeks!!!!!!

- We managed to write a shell script that automatizes all the required steps and is submitted to lxbatch.cern.ch:
- Creates a map with no charges (Ansys) and converts it to Garfield
 - Launches a Garfield script that starts 2000 e⁻ 290 μm before the top GEM, executes the *microavalanche* procedure and writes an output file with x-end, y-end, z-end and t-end for each electron and ion in the simulation. To use multi-processor capability many Garfield sessions are started at the same time
 - Starts a ROOT macro that analyzes the output file and computes the electrons/ions ending place percentage, the real gain and the effective gain (if any)
 - Creates another Ansys macro applying to the kapton wall charges proportional to estimated percentages
 - Reconverts the Ansys solution to Garfield map, starts another simulation of 2000 e⁻ and continue

G. Croci (CERN) - 3rd RD51 collaboration meeting - Crete - 16-17 June 2009

19

(R. Veenhof summary, RD51 Collaboration Meeting in Crete, June 16-17, 2009)

MPGD Simulation: General Requirements

- high-computing time;
- low transmission speed (few Gb);
- hardly any disk space needed (compared to LHC experiments)

RD51 GRID Virtual Organization

Meeting with Patricia Mendez Lorenzo and Jakub Moscicki (IT) on September 4

“Test VO” to run Garfield applications on GRID :

<https://twiki.cern.ch/twiki/bin/view/ArdaGrid/GarfieldGridInstructions>

- **Setup “RD51 Virtual Organization” ~ 2-3 days**
- **Ask GRID participating institutes (members of RD51 -?) to allocate certain amount of CPU for RD51 jobs ~ month**

CERN / IT Requirements:

- **Run jobs regularly @ GRID (even if not many)**
- **RD51/GRID expert (interface between IT & RD51) – master the system with IT help**
- **RD51 VO administrator (accept new users, etc ...)**

How many RD51 people/institutes are interested in GRID?

(Reported in CERN-Council-S/049, September 7, 2009)

**INCREASING EFFICIENCY OF TECHNOLOGY TRANSFER
ACTIVITIES IN MEMBER STATES
REPORT ON THE ACTIVITIES OF THE TECHNOLOGY
TRANSFER NETWORK WITHIN THE FRAMEWORK OF
THE EUROPEAN STRATEGY FOR PARTICLE PHYSICS**

The RD-51 collaboration² on Micro Pattern Gaseous Detectors (MPGD) accounts for more than 50 institutes including non-PP institutes interested in developing detectors targeted to their research needs. Detector developments rely on PP technologies, such as Gaseous Electron Multipliers (GEM), MicroMEsh Gaseous Structure (MicroMEGAS), front-end readout and software. MPGD technologies are owned by organisations that are members of the TT Network and constitute therefore a very good case for technology pooling. Industry is willing to manufacture the technologies for the community's needs but has also shown interest in commercializing detectors provided a better understanding of the market potential is made available.

The TT Network considers MPGD as very illustrative of the PP community's assets and will therefore focus the first pilot on this case.

→ See Hartmut Hillemanns Talk, Plenary Session (09:00-12:30) on November 25th

FP7 AIDA Proposal

<https://espace.cern.ch/aida/default.aspx>

- Inform RD51 institutes about AIDA at the RD51 mini-week in September;
- Ask to express interest to national contacts / WP Conveners (email to rd51-cb);
- RD51 as collaboration can not participate, could help in discussions with WP Conveners;

WP#	Type	Task	Description	WP Editors	Budget (kE)					
1	MGT		Project management and communication	S. Stavrev L. Serin	500					
		1,1	Project management and administration							
		1,2	Communication, documentation and outreach							
2	COORD		Development of common software tools	F. Gaede P. Mato	1100					
		2,1	Coordination of workpackage							
		2,2	Geometry toolkit for HEP							
		2,3	Reconstruction toolkit for HEP							
3	COORD		Microelectronics and detectors/electronics integration	H-G Moser V. Re	1100					
		3,1	Coordination of work package							
		3,2	3D Interconnection of microelectronics and semiconductor detectors							
		3,3	Shareable IP blocks for HEP							
4	COORD		Relation with industry	S. Stapnes P. Sharp	300					
		4,1	Coordination of work package							
		4,2	User/topical working groups (to be defined)							
5	SUPP		Transnational access DESY	I. Gregor	100					
5,1			Test beams		150					
						6	SUPP		Transnational access CERN	H. Taureg
6,1			Test beams and irradiation facilities		650					
						7	SUPP		Transnational access European irradiation facilities	M. Mikuz
						7,1	Facility 1			
						7,2	Facility 2			
7,3	Facility 3									
8	RTD		Improvement and equipment of irradiation and beam lines	E. Gschwendtner H. Taureg	3000					
		8,1	Coordination of work package							
		8,1	Test beams at CERN and Frascati							
		8,2	Upgrade of proton and neutron irradiation facilities at CERN							
		8,3	Qualification of components and common database							
		8,4	General beam and irradiation lines equipment							
8,5	Common DAQ infrastructure for combined test beams									
9	RTD		Advanced Infrastructure for detector R&D	H. Taureg	3000					
		9,1	Coordination of work package							
		9,2	Gas detector facilities							
		9,3	Precision pixel infrastructure							
		9,4	Granular calorimeter studies infrastructure							

**9.1.2 RD51-
Gaseous Detectors**

FP7 AIDA - WP9.2 Gaseous Tracking

Document - P. Colas, K. Desch, J. Wotschak after discussions with RD51 institutes

9.2.1 A facility for a large TPC and Gridpix/GOSSIP characterization at DESY

We propose to extend and improve this facility in order to meet the requirements needed for the development of advanced endplates. The same facility can also be used to characterize readout structures (InGrids, GEMGrids etc) and long strip MPGDs to be developed for Gossip and/or GridPix and muon detectors for a sLHC upgrade.

9.2.2 Infrastructure for the development of large-area MPGD

The proposed project will extend access to the existing facilities in the CERN/EN-ICE workshop. We are submitting a request for funding, through the AIDA proposal, of part of the manpower for operating the infrastructure required for R&D on large-size MPGDs. In addition, we ask for funding for the base materials required for this R&D work. This task is to be led by CERN, with possible manpower contribution from other partners.

9.2.3 Readout system for pixelized gaseous detectors

CMOS pixel readout of MPGD-based gaseous detectors has been shown to be an interesting novel development for gaseous detectors. A readout-system (based on custom FPGA readout modules) which fulfils the needs of particle physics experiments shall be developed and deployed within this project as an infrastructure usable for all groups working on pixel-based readout, both for a TPC and for planar tracking detectors (Gossip, GridPix).

CERN EN/ICE Workshop Upgrade News

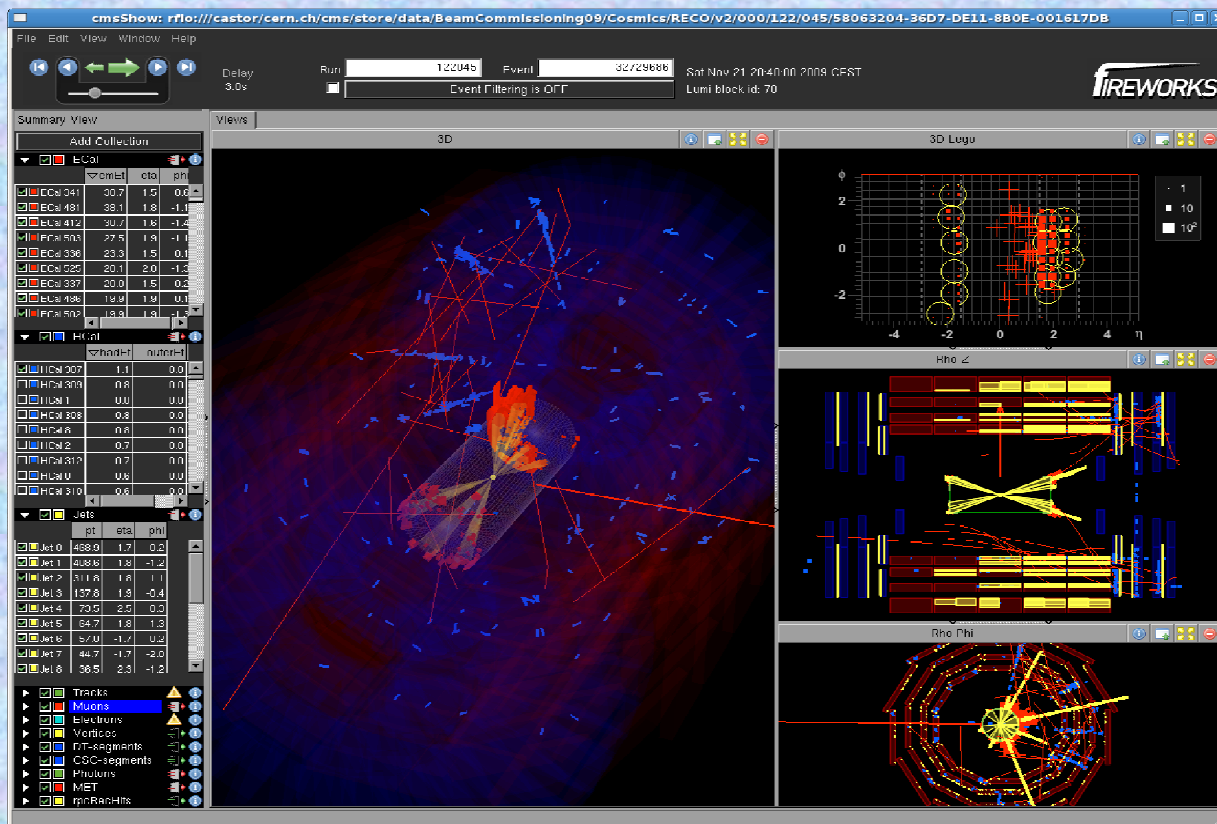
Meetings with CERN Management on Nov. 6 and Nov. 19:

(Sergio Bertolucci, CERN Director for Research and Scientific Computing, Philippe Bloch, Head of PH Department, Allain Gonidec, Deputy Head of PH, and Roberto Saban, EN Department Deputy/Head of EN/ICE Group)

- The CERN will purchase the subset of machines necessary to carry out R&D on large size GEM & Micromegas and the associated large size read-out boards.
- New machines coupled to the existing ones will allow to make 2m x 1m Bulk Micromegas and 2m x 0.5 m GEMs in the current CERN EN/ICE facility.
- This development will allow to reinforce the CERN/MPGD workshop infrastructure and open the road to the very promising large-area MPGD-based particle detectors, in a view of large-scale production in industry at a later stage.

Workshop Upgrade Timescale ~ 1 year

Remarkable Week for the CERN/LHC Collider



**Circulating beams
in the LHC**

**Beam – gas event
in the CMS (Nov. 22):**

- In HEP, we are presented with so many measurements (cross section, limits, ...) that we often forget that we are talking about instruments and the measurements they have made, and the methods have been used.

- The surprise is how precise the detectors themselves are; the challenge of hadron colliders is to exploit that precision in the regime where statistics is no longer a problem, and everything is dominated by the performance and understanding of the detector ('systematics').

4th RD51 Collaboration Meeting (November 23-25, 2009):

<http://indico.cern.ch/conferenceOtherViews.py?view=standard&confId=72610>

Please register to the meeting, if not done yet

Change to 2 Working Group Meetings scheduled at the same time

Monday:

13:00 - 14:00 Opening Session (BE Auditorium Meyrin)

**14:00 - 18:00 Parallel Session – WG1 (BE Auditorium Meyrin)
Parallel Session – WG5 (6-2-004)**

Tuesday:

**09:00 – 13:00 Parallel Session – WG2 (BE Auditorium Meyrin)
Parallel Session - WG7 (6-2-004)**

**14:00 – 18:00 Parallel Session - WG4 (BE Auditorium Meyrin)
Parallel Session - WG6 (6-2-004)**

18:00-19:30 Collaboration Board Meeting

20:00-23:00 Collaboration Dinner

Wednesday:

09:00-13:00 Plenary Session (BE Auditorium Meyrin)

14:00-16:30 Plenary Session (BE Auditorium Meyrin)

4th RD51 Collaboration Meeting (November 23-25, 2009):

<http://indico.cern.ch/conferenceOtherViews.py?view=standard&confId=72610>

Tuesday, November 24, 14:00-14:45, WG4 Parallel session:

« Electron transport calculations in detector gas mixtures » (S. Biagi)

Wednesday, November 25, 09:00-13:00 Plenary Session Talks:

“Current World-wide detector R&D efforts for a linear e⁺e⁻ collider (M. Stanitzki)

“Recent Developments in Thick-GEM Detectors” (A. Breskin)

There a lot of interesting contributions !

Enjoy the meeting !