

## EuCARD WP4 - Accelerator Networks

coordinated by

Ralph Assmann, Jean-Marie De Conto, Mariusz Grecki,  
Jens Osterhoff, Walter Scandale, Peter Spiller, Ezio  
Todesco, Wolfgang Weingarten, and Frank Zimmermann

9<sup>th</sup> EuCARD Steering Committee Meeting  
GSI Darmstadt, 1-2 December 2011



# ACCNET



# Accelerator Science Networks



## Coordination & Management

coordinated by Walter Scandale, IN2P3 ; Peter Spiller, GSI ; Frank Zimmermann, CERN

## EURO-LUMI



*accelerators & colliders performance*

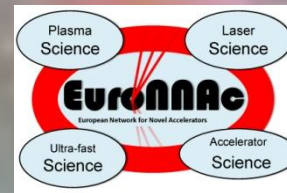
coordinated by Frank Zimmermann & Ezio Todesco, CERN



## RFTECH

*sc & nc rf technologies*

coordinated by Jean-Marie de Conto, UJF Mariusz Grecki, DESY Wolfgang Weingarten, CERN



## EuroNNAc

*novel accelerators*

coordinated by Ralph Assmann, CERN Jens Osterhoff, DESY Henri Videau, CNRS



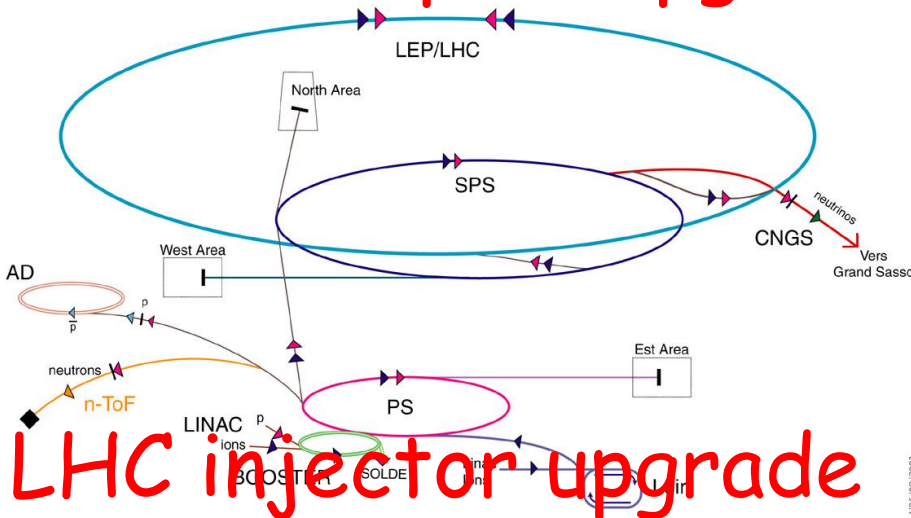
# EUROLUMI

brings together experts in beam dynamics, magnets, collimation, RF, & experiments

FAIR



## CERN complex upgrade



## LHC injector upgrade

p (proton)    antiproton  
 ion          proton/antiproton conversion  
 neutrons    neutrinos  
 AD Antiproton Decelerator    LHC Large Hadron Collider  
 PS Proton Synchrotron        n-ToF Neutrons Time of Flight  
 SPS Super Proton Synchrotron    CNGS Cern Neutrinos Grand Sasso

### LHC phase-2 upgrade paths for IP1 & 5

**early separation (ES)** J.-P. Koutchouk

stronger triplet magnets

D0 dipole

small-angle crab cavity

- ultimate beam (1.75x10<sup>11</sup> p/s/bunch, 25 ns spacing)  $\beta^* \sim 10$  cm
- early separation dipoles inside detectors, crab cavities
- hardware inside LHC (CMS detector)
- hardware crab cavities off-axis

**full crab crossing (FCC)** L. Evans, W. Scandale, F. Zimmermann

stronger triplet magnets

small-angle crab cavity

- ultimate LHC beam (1.7x10<sup>11</sup> p/s/bunch, 25 ns spacing)  $\beta^* \sim 10$  cm
- crab cavity with 10% rf voltage
- hardware crab cavities off-axis

## LHC IR & beam parameter upgrade

**large Piwinski angle (LPA)**

wire compensator

- 50 ns spacing, longer & more intense bunches (5x10<sup>11</sup> p/s/bunch)
- $\beta^* \sim 25$  cm, no elements inside detectors
- long-range beam-beam wire compensation
- novel operating regime for hadron colliders, beam generation

**low emittance (LE)** R. Garoby

- ultimate LHC beam (1.7x10<sup>11</sup> p/s/bunch, 25 ns spacing)
- $\beta^* \sim 10$  cm
- smaller transverse emittance
- constraint on new injectors, off-axis  $\beta$ -beat

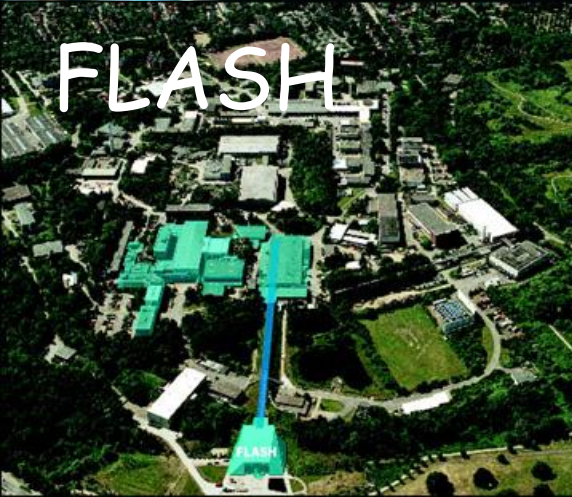
+  
 medical accelerators?  
 +  
 initial initiative on  
 plasma acceleration

# RFTECH

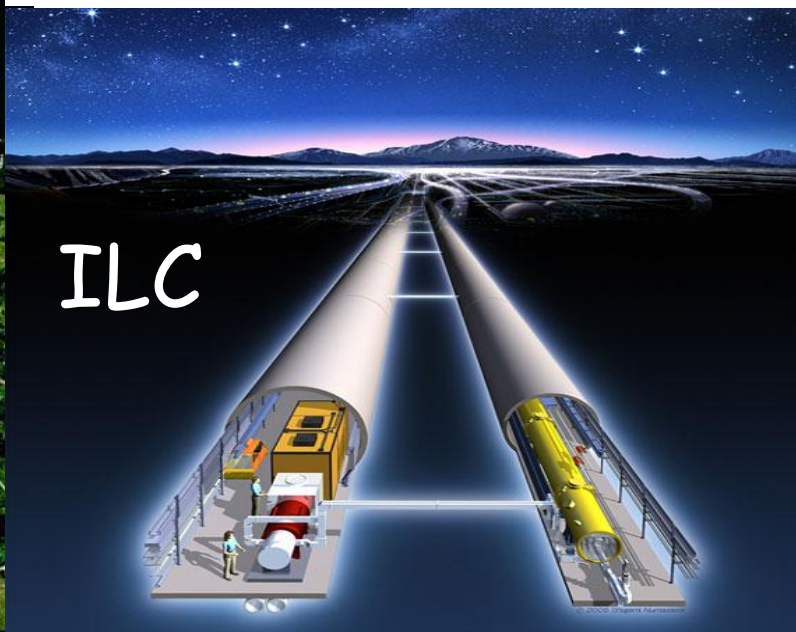
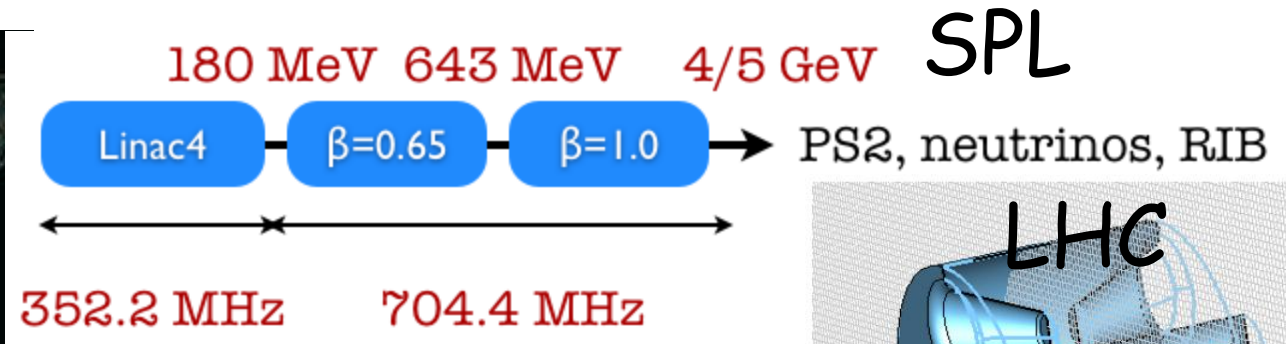
brings together RF experts from different labs, proton & electron accelerators, CLIC and ILC, ... ; encompasses all aspects of RF technology, e.g. klystron development, RF power distribution system, cavity design, and low-level RF system, for linear accelerators, storage rings, and associated research infrastructures, including transversely deflecting (crab) cavities and financial aspects such as costing tools



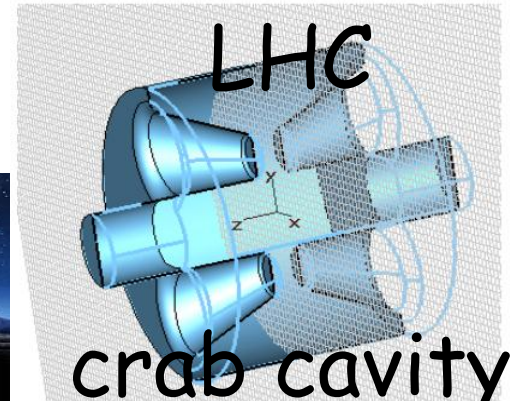
XFEL



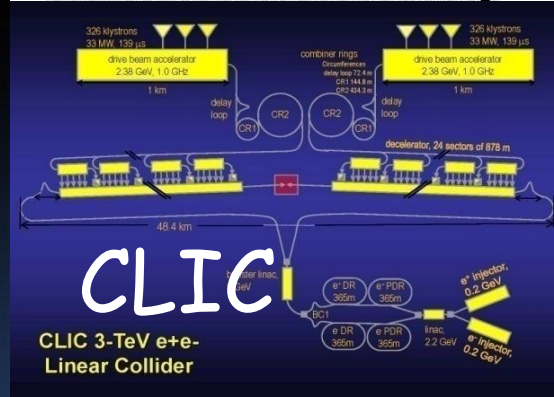
FLASH



ILC



LHC  
crab cavity

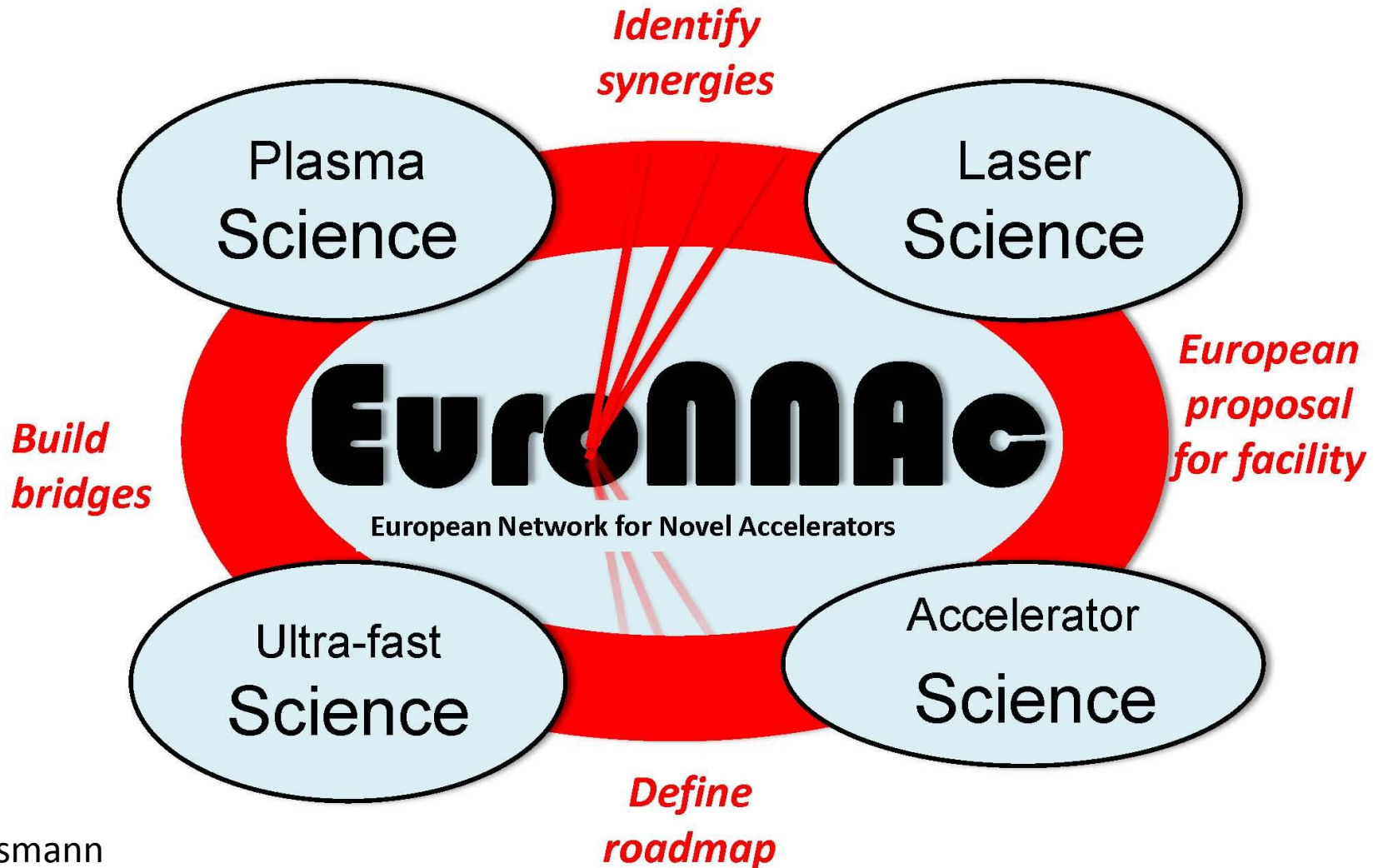


CLIC

CLIC 3-TeV e+e- Linear Collider



**EuroNNAC** will identify possible usage of advanced accelerator techniques in large-scale conventional facilities and to identify a roadmap towards an advanced accelerator facility for big science with applications in applied and fundamental research



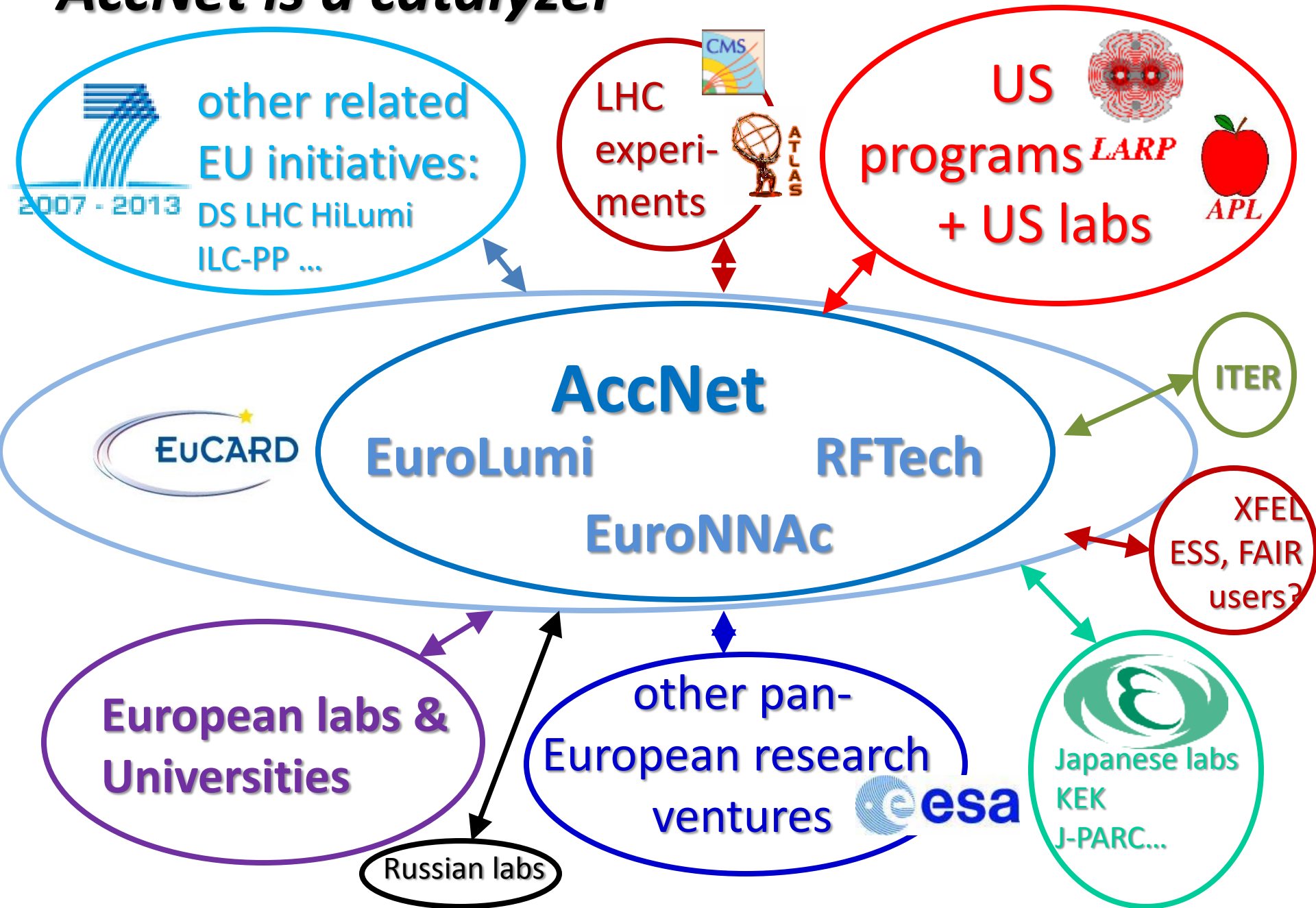
# AccNet tools



- ❑ **annual workshops**
- ❑ **topical meetings and mini-workshops**
- ❑ **capability of inviting or exchanging experts over periods of typically a week to a month**
- ❑ **exploratory studies & collaborations**
- ❑ **opportunities for students**
- ❑ **unique place of discussion with users**

→ *exchange of ideas and expertise aimed identifying the most promising strategies and technologies*

# AccNet is a catalyzer



# AccNet deliverables

Deliverables of tasks	Description/title	Nature	Delivery month	Status
4.1.1	Continually updated AccNet web site	O	M2	DONE, OK
4.1.2	AccNet Strategy for future proton & electron facilities in Europe	R	M48	on track
4.2.1	Continually updated EuroLumi web site	O	M2	DONE, OK
4.2.2	EuroLumi Strategy and issues for LHC IR, LHC injector and beam-parameter upgrade path(s), with comment on longer-term prospects, and for FAIR	R	M48	on track
4.3.1	Continually updated RFTECH web site	O	M2	DONE, OK
4.3.2	Strategy/result for SRF test infrastructures	R	M24	DONE, OK
4.3.3	RFTECH strategy/result for cavity design, LLRF & HPRF systems and design integration, and costing tools	R	M48	on track



# completed AccNet deliverables

**D.4.1.1** –Continually updated **AccNet web site**

<http://cern.ch/accnet/> )

**D.4.2.1** – A continually updated **EuroLumi web site**

(<http://cern.ch/accnet/Tasks/Eurolumi/> )

**D.4.3.1** – A continually updated **RFTech web site**

(<http://cernc.ch/accnet/Tasks/Rftech/> )

**D4.3.2** – **Strategy/result for SRF test infrastructures:**

Complete

The AccNet web sites are documented in a **report**

<https://edms.cern.ch/file/1001866/4/EuCARD-Del-D4.1.1-D4.2.1-D4.3.1-1001866-v3.0.pdf>

The completed deliverables are available from the link

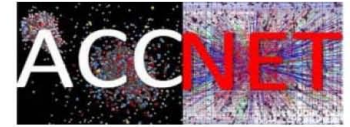
<http://cern.ch/EuCARD/about/results/deliverables/> .

<http://cern.ch/accnet/>  
*new address*

# AccNet web site



**Accelerator Science  
Networks**  
EuroLumi, EuroNNac and  
RFTech



Coordinated by [P. Spiller, W. Scandale](#)  
and [F. Zimmermann](#)

*AccNet is a Networking Activity (WP4) in the framework of [EuCARD](#)  
(European Coordination for Accelerator Research & Development)*

<a href="#">Main Objectives</a>	<a href="#">Network Structure</a>	<a href="#">Activity Reports</a>	<a href="#">WP4 Collaboration Workspace</a>	<a href="#">Job Opportunities</a>	<a href="#">Workshops</a>	<a href="#">Literature and Presentations</a>	<a href="#">Links</a>
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Notice: this site is under construction. Please accept our apologies for its incompleteness and yet missing information.

early in 2011 (after retirement of Bernard Mouton) all AccNet web sites were transferred from LAL to a CERN server for easier access and maintenance

**AccNet is composed of three networks**

[EuroLumi](#)

[EuroNNac](#)

[RFTech](#)

## Hot News

17-21 October 2011	● <a href="#">LLRF-2011 Workshop</a> , DESY - <b>NEW!</b>
20-21 June 2011	● <a href="#">Workshop on Optics Measurement, Correction &amp; Modelling "OMCM"</a> , CERN - <b>NEW!</b>
16-18 June 2011	● <a href="#">MIXDES2011</a> , Gliwice - <b>NEW!</b>
6-8 June 2011	● <a href="#">Workshop on Linac Operation with Long Bunch Trains</a> , DESY - <b>NEW!</b>
10 May 2011	EuCARD WP4 AccNet Steering & Coordination Meeting, CNRS headquarters, room K024, 16:00, Paris - <b>NEW!</b>

*AccNet Article in EuCARD Newsletter no 8 (March 2011):*  
[Proposed increase in energy takes LHC even further into the future](#)

*AccNet Articles in EuCARD Newsletter no 7 (December 2010):*  
[A knack for novel acceleration techniques](#)  
[Crystal clear ideas for beam collimation](#)

*AccNet Article in CERN Courier (24 February 2010)*  
[Workshop pushes proton-driven plasma wakefield acceleration](#)

AccNet  
Deliverable  
D4.3.2

–  
“Strategy/result  
for SRF test  
infrastructures”

–  
has become a  
EuCARD  
monograph!





# AccNet milestones

## **M.4.1.3**

- 3<sup>rd</sup> **general AccNet Steering meeting** during the 2nd EuCARD Annual meeting at CNRS.

## **M4.2.3:**

- Instead of a general annual EuroLumi workshop, **2 topical mini-workshops** have been organized and supported during the third year: **OMCM, LHC-CC11** (*note recent possible overlap with FP7 HiLumi*)
- **next major EuroLumi workshop in June 2012**

## **M4.3.3:**

- 3<sup>rd</sup> annual **RFTECH workshop will be held 11-13 December 2011**

# Retirement of RFTech Co-ordinator W. Weingarten

29.11.2011

*Many thanks & good luck, Wolfgang!*



# some AccNet achievements since May

- **3rd EuCARD WP4 AccNet Steering & Coordination Meeting**, CNRS headquarters, 10 May 2011
- 1st **AccNet-EuroNNAc workshop**, May 2011
- **AccNet-RFtech co-sponsored Workshop Linac Operation with Long Bunch Trains**, DESY, 6-8 June '11
- **AccNet-RFTech co-sponsored MIXDES2011**, Gliwice, 16-18 June 2011
- **AccNet-RFTech co-sponsored Workshop LLRF-2011**, DESY, 17-21 October 2011
- **AccNet-EuroLumi Workshop on Optics Measurement, Correction & Modelling "OMCM"**, CERN, 20-21 June 2011
- **AccNet co-sponsored MulCoPim'11**, Valencia, 21-23 September 2011
- **AccNet Workshop LHC-CC11 on LHC Crab Cavities**, CERN 14-15 November 2011
- expansion of **collaborations with CINVESTAV/Mexico, ESA, ITER, Kyoto U...** MulCoPim'2011; 1<sup>st</sup> MEAS; 3<sup>rd</sup> Mexican student at CERN



# 3rd general AccNet Steering meeting, CNRS, May 2011

Centre national de la recherche scientifique  
Campus Gérard Mégie



vendredi 13 mai 2011  
metrofrance.com/paris

min 10° / max 22°  
qualité de l'air : moyenne

**metro PARIS**  
TOUTE L'INFO DE LA CAPITALE ET DE SA RÉGION

## Pourquoi les RER A et B sont en grève

De très fortes perturbations sont attendues aujourd'hui Les conducteurs dénoncent une dégradation brutale des conditions de transport

A la RATP, c'est une première : hier, qui il n'y avait aucun créneau, le mouvement qui a la RATP concerne cette semaine.

# **1st general AccNet EuroNNAc Workshop**

CERN, 3-6 May 2011

<https://indico.cern.ch/internalPage.py?pagelId=0&confId=115336>

**Participants: about 93 persons (from all over the world...)**

**About 46 presentations & discussions**

**Goal:**

**form the network and define the work towards a significant FP8 proposal for novel accelerator facilities in Europe.**

Organizer: Ralph Assmann

# AccNet-RFTech workshop on linac operation with long bunch trains

6-8 June 2011, DESY, Hamburg

<http://indico.desy.de/conferenceProgram.py?confId=3007>

Participants: about 40 persons (DESY, US, Japan, UK, TUL, ...)

About 35 presentations

Thematic sessions:

1. Results and analysis from the 9mA studies
2. Toward future 9mA studies
3. Operations modes for FLASH2
4. Feedback and control of longitudinal phase space
5. Machine protection for long bunch-train operation
6. Beam-based feedback systems

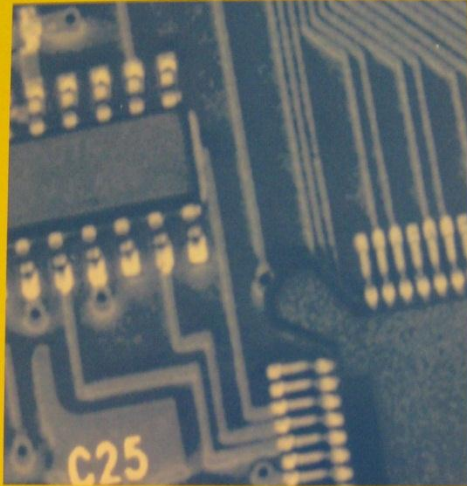
Organizers: Nicholas Walker, Siegfried Schreiber, John Carwardine



# Accnet RFTech co-sponsored MIXDES2011 Proceedings

Proceedings of the 18<sup>th</sup> International Conference  
**MIXED DESIGN OF INTEGRATED  
CIRCUITS AND SYSTEMS**

## MIXDES 2011



**Gliwice, Poland**  
**16 - 18 June, 2011**

*Organised by:*

Department of Microelectronics and Computer Science,  
Technical University of Łódź, Poland

Institute of Electronics,  
Silesian University of Technology, Poland

Institute of Microelectronics and Optoelectronics,  
Warsaw University of Technology, Poland

*in co-operation with:*

Poland Section IEEE - CAS & ED Chapters

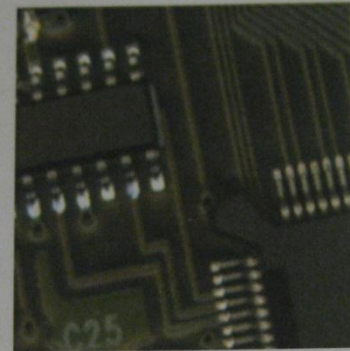
Section of Microelectronics  
and Section of Signals, Electronic Circuits and Systems  
of the Committee of Electronics and Telecommunication  
of the Polish Academy of Sciences

Proceedings of the 18<sup>th</sup> International Conference



**MIXED DESIGN OF INTEGRATED  
CIRCUITS AND SYSTEMS**

## MIXDES 2011



**Gliwice, Poland**  
**16 - 18 June, 2011**

*Organised by:*

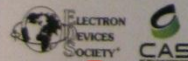
Department of Microelectronics and Computer Science,  
Technical University of Łódź, Poland  
Institute of Microelectronics and Optoelectronics,  
Warsaw University of Technology, Poland

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Poland Section IEEE - CAS & ED Chapters  
Section of Microelectronics  
and Section of Signals, Electronic Circuits and Systems  
of the Committee of Electronics and Telecommunication  
of the Polish Academy of Sciences

*supported by:*

RFTech Scientific Network  
Compact Modelling Network





## xTCA for Instrumentation

Module Management Controller for MicroTCA-based Controller Board .....  
*P. PEREK, A. MIELCZAREK, P. PRĘDKI, D. MAKOWSKI, A. NAPIERALSKI (Tech. Univ. Łódź, POLAND)*

uTCA-based Controller .....  
*A. MIELCZAREK, D. MAKOWSKI, G. JABŁOŃSKI, A. NAPIERALSKI, P. PEREK, P. PRĘDKI (Tech. Univ. Łódź, POLAND),  
T. JEŻYŃSKI, F. LUDWIG, H. SCHLARB (DESY, GERMANY)*

AMC Vector Modulator for the LLRF System .....  
*K. CZUBA, S. BOU HABIB, D. SIKORA (Warsaw Univ. of Techn., POLAND)*

Automated Generation of FRU Devices Inventory Records for xTCA Devices .....  
*J. WYCHOWANIAK, P. PEREK, D. MAKOWSKI, A. NAPIERALSKI (Tech. Univ. Łódź, POLAND)*

EPICS-based Visualisation and Control in DAQ Systems .....  
*P. PRĘDKI, A. PIOTROWSKI, M. ORLIKOWSKI, T. KOZAK, G. JABŁOŃSKI, D. MAKOWSKI, A. NAPIERALSKI (Tech. Univ. Łódź, POLAND)*

## AccNet-RFTech “xTCA” session @ MIXDES2011

Low Phase Noise PLL Based LO Generation Module for Femtosecond Precision RF Field Detection .....  
*Ł. ZEMBALA, K. CZUBA (Warsaw Univ. of Techn., POLAND), M. HOFFMANN, F. LUDWIG, H.-C. WEDDIG (DESY, GERMANY),  
M. ŻUKOCIŃSKI (Warsaw Univ. of Techn., POLAND)*

Performance Optimisation in Software for Data Acquisition Systems .....  
*A. PIOTROWSKI, M. ORLIKOWSKI, T. KOZAK, P. PRĘDKI, G. JABŁOŃSKI, D. MAKOWSKI, A. NAPIERALSKI (Tech. Univ. Łódź, POLAND)*



# AccNet-EuCARD Low-Level RF Workshop <http://llrf2011.desy.de>

17-20 October 2011, DESY Hamburg

## Topics:

- Reviews of the low-level RF system at various laboratories
- Fast and/or digital low-level RF control for pulsed and CW operation
- Applications of the digital signal processing at accelerator
- Software development
- LLRF systems (requirements, performance reached, modeling)

**Highlight:** Linear Technology on the ADCs technology edge and their current performance

**>118 participants from 16 countries , 9 industrial companies**

**44 talks including: 10 invited presentations ; 4 tutorials** (on Control System Fundamentals, Receiver Fundamentals, FPGA Programming, Embedded system development); 6 lab-talks: CERN, DESY, KEK, FNAL, JLAB, Cornell; 1 industry talk (Linear Technology); 1 welcome talk (Reinhard Brinkmann on DESY accelerator activities); 22 contributed talks (7 hardware, 7 software, 8 systems); **49 posters**

**Visit of DESY facilities (FLASH and PETRA) - FLASH was overbooked!**

**9 participants supported by RFTech**

Organizer: Mariusz Grecki





# EuCARD-AccNet Workshop Optics Measurements, Corrections and Modeling for High-Performance Storage Rings “OMCM”

20-22 June 2011, CERN

<https://indico.cern.ch/conferenceDisplay.py?confId=132526>

**draft summary to be finalized and published**



**Participants: about 59 persons (many institutes in Europe, US, and Japan)  
46+3 presentations**

**Sessions: Motivation for HE machines, colliders, HI machines, light sources and damping rings; Experience from colliders, high energy and intensity machines - I + II; Experience from light sources and damping rings ; Techniques review – I & II; Modeling ; Beam diagnostics ; LHC complex present and future plans ; Prospects and future developments**

**Organizers:**

Rama Calaga, Massimo Giovannozzi,  
Rogelio Tomas, Frank Zimmermann





# MULCOPIM '11

21, 22, 23 September 2011  
Valencia, Spain

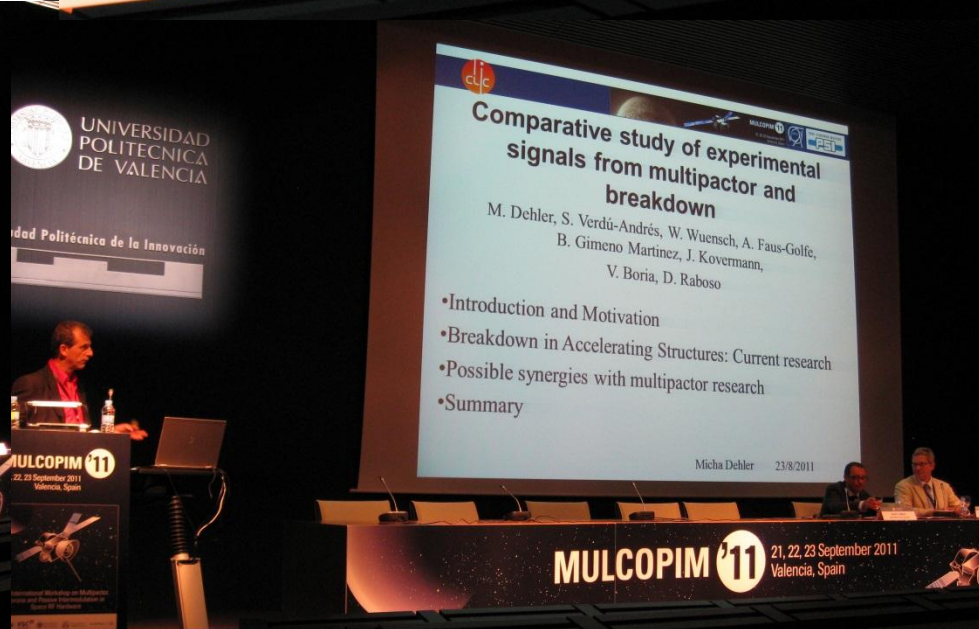
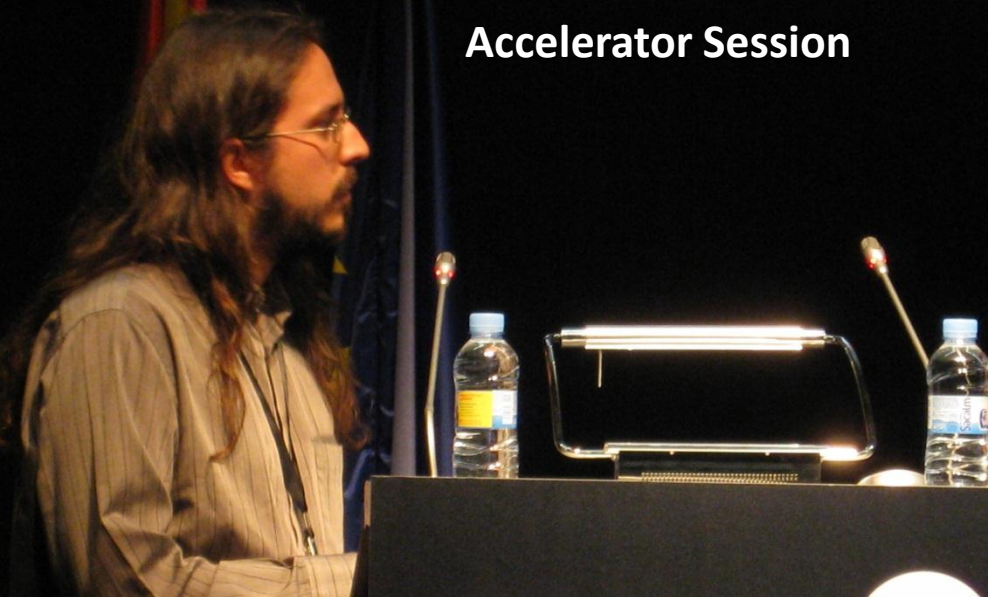


Particle Accelerators  
technical sponsors





# MulCoPim'11 Accelerator Session



MulCoPim topics: multipactor components, multipactor Tx lines, multipactor dielectrics; corona, multipactor experimental, multipactor software, multipactor multicarrie; PIM, SEY, Accelerators



# 5<sup>th</sup> Joint EuCARD-AccNet – LARP – KEK – CI/DL workshop on LHC crab cavities

14-15 November 2011, CERN

<https://indico.cern.ch/conferenceDisplay.py?confId=149614>

draft summary to be finalized and published



**Participants: about 52 persons (many institutes in Europe, US, and Japan)**

**46+3 presentations**

**Main results:** convergence to 2 (3) compact crab-cavity designs; first AI prototypes; detailed cavity specifications will be prepared by April 2012 based on initial set of HL-LHC parameters; beam test of the compact design in the SPS and the LHC are pre-requisites for a final installation in LHC Points 1 and 5.

**Organizers:**

Rama Calaga, Rogelio Tomas, Frank Zimmermann

# AccNet publications

## AccNet dissemination in 5<sup>th</sup> semester

- three outreach talks in Japan (KEK, Hiroshima U., Kyoto U.)
- invited presentations at ATLAS and CMS upgrade workshops
- invited talk at first Mexican Accelerator school

## EuCARD AccNet documents

- about **80 in total**, including 12 in 5<sup>th</sup> semester
  - **1 CERN Yellow Report**
  - **2 journal articles**
  - **31 conference presentations**
  - **1 PhD thesis**
  - **1 master thesis**
  - **1 EuCARD monograph**

*not all in the database*

# some AccNet talk & papers from 2011

many not yet in the database

F. Zimmermann, [Machine Progress Towards Higher Luminosity](#), CMS Upgrade Meeting, FNAL, Chicago, 7 November 2011 ; F. Zimmermann, [Hadron Colliders](#), First Mexican Particle Accelerator School "MePAS," Guanaojuato, 7 October 2011 ; R. Cimino, [A surface study on the origin of SEY reduction on accelerator walls](#), CERN, 29 July 2011 ; F. Zimmermann, [Large Hadron Collider - Status & Future Plans](#), Kyoto University, Kyoto, 22 July 2011; F. Zimmermann, [Large Hadron Collider - Status & Future Plans](#), Hiroshima University, East Hiroshima, 19 July 2011; F. Zimmermann, [LHC Performance & Future Plans](#), KEK, 1 July 2011 ; F. Zimmermann, [LHC Machine Status & Plans](#), ATLAS week, CERN, Geneva, 20 June 2011 ; E. Todesco and F. Zimmermann (eds), [The Higher-Energy Large Hadron Collider](#), Proceedings of the EuCARD-AccNet HE-LHC workshop, Malta, 14-16 October 2010, CERN, EuCARD-CON-2011-001 ; D. Shatilov, E. Levichev, E. Simonow, M. Zobov, [Application of Frequency Map Analysis to Beam-Beam Effects Study in Crab Waist Collision Scheme](#), PRST-AB, 14, 014001 (2011) [WPs 4 & 11] ; R. Calaga (BNL), S. Myers (CERN), F. Zimmermann (CERN), [Summary of the 4th LHC Crab Cavity Workshop "LHC-CC10"](#), EuCARD-REP-2011-001 (2011) ; F. Zimmermann, [HL-LHC: parameter space, constraints and possible options](#), Proc. Chamonix 2011 workshop on LHC performance, CERN-ATS-2011-005 (2011) ; Rumolo, F. Zimmermann, and O. Boine-Frankenheim, [Summary of EuCARD-AccNet CERN-GSI Workshop on Electron Cloud](#), CERN, Geneva, 7-8 March 2011 ; U. Iriso, [Electron Clouds Thresholds with 75 ns Bunch Spacing \(draft\)](#), 11 February 2011; several others still in preparation: OMCM summary, LHC-CC11 summary



# AccNet papers from PAC11, IPAC11 and MulCoPim11

many not yet in the database

O. Dominguez, U. Iriso, H. Maury, G. Rumolo, F. Zimmermann, "**Benchmarking Electron-Cloud Build-Up and Heat-Load Simulations against Large-Hadron-Collider Observations,**" MulCoPim'2011 ; R. Calaga, T. Baer, J. Barranco, R. Tomas, J. Wenninger, F. Zimmermann, B. Yee-Rendon, "**Beam Losses Due to Abrupt Crab Cavity Failures in the LHC,**" PAC'11 New York ; G. Xia, et al, "**A Proposed Experimental Test of Proton-Driven Plasma Wakefield Acceleration Based on CERN SPS,**" PAC11 New York ; G. Franchetti, F. Zimmermann, "**Electron-cloud Pinch Dynamics in Presence of Lattice Magnet Fields,**" IPAC11 San Sebastian ; G.H.I. Maury Cuna, G. Arduini, G. Rumolo, L.J. Tavian, F. Zimmermann, "**Simulation of Electron-cloud Build-Up for the Cold Arcs of the LHC and Comparison with Measured Data,**" IPAC11 San Sebastian ; T. Baer, R. Calaga, R. Tomás, J. Tückmantel, J. Wenninger, F. Zimmermann, "**LHC Machine Protection against Very Fast Crab Cavity Failures**," IPAC11 San Sebastian ; C.O. Domínguez, F. Zimmermann, "Luminosity Optimization for a Higher-Energy LHC," IPAC11 San Sebastian C.O. Domínguez, G. Arduini, V. Baglin, G. Bregliozzi, J.M. Jimenez, E. Métral, G. Rumolo, D. Schulte, F. Zimmermann, "**Electron Cloud Parameterization Studies in the LHC,**" IPAC11 San Sebastian ; C.M. Bhat, F. Zimmermann, "**LHC Luminosity Upgrade with Large Piwinski Angle Scheme: A Recent Look,**" IPAC11 San Sebastian ; S. Hillenbrand, R.W. Assmann, A.-S. Müller, T. Tückmantel, F. Zimmermann, "**Energy Spectrometer Studies for Proton-driven Plasma Acceleration,**" IPAC11 San Sebastian ; R.W. Assmann, I. Efthymiopoulos, S.D. Fartoukh, G. Geschonke, B. Goddard, C. Heßler, S. Hillenbrand, M. Meddahi, S. Roesler, F. Zimmermann, A. Caldwell, G.X. Xia, P. Muggli, "**Accelerator Studies on a Possible Experiment on Proton-driven Plasma Wakefields at CERN,**" IPAC11 San Sebastian

# EuroLumi exchanges & joint studies

Mexican PhD student Humberto Maury (CINVESTAV)

- **e-cloud simulations for LHC & HL-LHC**

Mexican master student Bruce Yee (CINVESTAV)

- **simulations of LHC crab-cavity failure scenarios**

Mexican master student Cristhian Valerio (CINVESTAV)

- **H- source**

Spanish expert Ubaldo Iriso (CELLS/ALBA)

- **simulations of LHC e-cloud build up**

Italo-german expert Giuliano Franchetti (GSI)

- **incoherent e-cloud effects & resonance trapping**

US-LARP physicist Chandra Bhat (FNAL)

- **generation & stability of long flat bunches for LHC**

US-LARP physicist Rama Calaga (BNL), LARP physicist Uli Wienands (SLAC)

- **LHC crab cavities**                      - **lessons from SSC and VLHC for HE-LHC**

Japanese expert Kazuhito Ohmi (KEK)

- **beam-beam & e-cloud simulation studies for LHC, HE-LHC & HL-LHC**

Italian expert Roberto Cimino (INFN-LNF)

- **e-cloud surface physics & mitigation**

Russian and European experts S. Dabagov (INFN-LNF) – **crystal collimation**

US experts Mike Plum (ORNL) and Glenn Decker (ANL) – **optics & beam diagnostics**

# planned AccNet workshops

- **3rd RFTECH Annual Meeting**, U Rostock, 11-13 December 2011
- **AccNet-RFTech Workshop on System Integration & LLRF Collaboration**, WUT 14-16 December 2011
- **AccNetEuroLumi – INFN - LER joint workshop on electron cloud effects & mitigation E-CLOUD'12**, 5-9 June, Italy
  
- **AccNet-EuroLumi Workshop on dynamic vacuum at/near GSI**
- **AccNet-EuroLumi & CI joint workshop on Extreme Beams, ?**
- **2nd AccNet-EuroLumi workshop on the High-Energy LHC**, fall 2011 or early 2012, e.g. focusing on injector
- **LHC crystal collimation workshop**, fall 2012?
- **AccNet-EuroLumi Workshop on LHC/FAIR beam instrumentation?**



# 3<sup>rd</sup> Annual RFTech meeting

12-13 December 2011, U Rostock

<http://lpsc.in2p3.fr/Indico/internalPage.py?pageld=2&confId=646>

## **RF cavity and couplers design**

- Crab cavity design alternatives
- SC cavity development
- NC cavity development
- Power couplers

## **Superconducting (SC) RF**

- Optimisation of RF control for SC accelerators
- HIE-Isolde cavity and test cryostat
- Piezo control for Lorentz force detuning compensation
- SC cavities for proton linacs
- SRF Test infrastructures

## **Low-level and high-power RF systems**

- New electronics/technologies for LLRF systems
- Multi-beam klystron development
- Klystrons for 12 GHz CLIC application
- RF control for klystron-powered SC cavities
- Modulator design for pulsed SC proton
- Linacs with high repetition rate
- State of the art and perspectives of IOT RF power sources
- Solid state amplifiers

## **Costing tools**

Possible topics: System Engineering Tools and their application to LLRF design process

## **Reliability**

- Reliability data exchanges
- Improving reliability

Organizers: Ursula van Rienen, Jean-Marie De Conto, Mariusz Grecki

# EuCARD-AccNet LLRF Collaboration meeting

14-16 December 2011, Warsaw University of Technology

<https://indico.desy.de/conferenceDisplay.py?confid=4991>

Programme under construction

Participants: about 35 persons (DESY, WUT, TUL,NCBJ,...)  
RFTech will support all participants of this meeting

About 40 presentations

Main topic: integration of LLRF activities.

Virtual tour of main University building is here:

<http://www.wirtualnapolitechnika.pl/>

Organizer: Krzysztof Czuba







**La Biodola, Isola d'Elba, Italy**  
**<http://www.hotelhermitage.it/>**  
**from 5 to 8 June 2012**

topics: SEY models, e-cloud build & e-cloud effects in accelerators & space applications, beam induced multipactoring, surface properties, mitigation measures, microwave diagnostics, ... electron clouds at LHC, FAIR, SuperB, KEKB, SuperKEKB, SPS, PS, ILC, CLIC, Cesr-TA, FNAL, RHIC, ESA satellites, ...

**more information at:**

**<http://www.infn.lnf.conference/ecloud12>**

contacts: Roberto Cimino, Frank Zimmermann



*in memory of  
Francesco Ruggiero*

# proposed AccNet highlights talks at EuCARD 2012

## **Compact Crab Cavities for HL-LHC**

*Erk Jensen (CERN) or Graeme Burt  
(Lancaster U./ CI)?*

## **Achromatic Telescopic Squeeze (ATS)**

*Stephane Fartoukh (CERN)*

## **Progress on High-Field Magnets**

*GianLuca Sabbi (LBNL)*



# use of resources

most/all AccNet mini-workshops have moderate expenses (<10 kCHF)

collaborators cover part of the costs

management with a lot of enthusiasm devotes extra time

# AccNet success indicators

excellent attendance to AccNet workshops  
from many European labs, universities, US laboratories,  
Japan, international organizations

impact:

- on most relevant topics
- initiated crab-cavity program for LHC
- e-cloud modeling & mitigation
- push for high-energy LHC

high cost efficiency ; exchange of 16 expert  
visitors ; two theses, 31 conf. papers, 2 journal  
articles, 1 EuCARD monograph

# AccNet conclusions

## EuroLumi gives input to LHC upgrade

strategy for LHC crab cavities, HL-LHC parameters, “LPA” scenario, flat-beam crab-waist scenario (w WP11), e-cloud mitigation techniques, revisions of LHC upgrade plans, energy upgrade

## RFTech organizes RF community

## AccNet is breaking new grounds

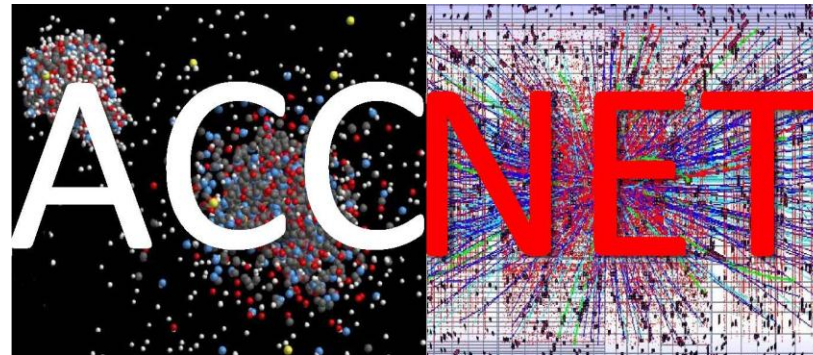
medical accelerators

plasma acceleration, crystal collimation

new contacts (ESA, CINEVESTAV, Kyoto U.)

## AccNet spells success





**pushes frontiers**

*for accelerators in Europe  
and around the world*

# Appendix

*AccNet*

*institutes & contacts*

# AccNet EuroLumi institutes & contacts

Institute	Name	Institute	Name
<a href="#"><u>BNL</u></a>	Calaga Rama	<a href="#"><u>GSI</u></a>	Boine-Frankenheim Oliver
	Drees Angelika	<a href="#"><u>INFN-LNF</u></a>	Biagini Marica
	Fischer Wolfram		Palumbo Luigi
	Peggs Steve		Spataro Bruno
<a href="#"><u>CERN</u></a>	Bottura Luca	<a href="#"><u>INFN-NA</u></a>	Vaccaro Vittorio
	Todesco Ezio	<a href="#"><u>KEK</u></a>	Ohmi Kazuhito
	Zimmermann Frank	<a href="#"><u>LBNL</u></a>	Furman Miguel
<a href="#"><u>CI</u></a>	Chattopadhyay Swapan	<a href="#"><u>MPP</u></a>	Caldwell Allen
<a href="#"><u>CNRS-LAL</u></a>	Mouton Bernard		Xia Guoxing
	Scandale Walter	<a href="#"><u>TEMF</u></a> <a href="#"><u>Darmstadt</u></a>	Mueller Wolfgang
	Variola Alessandro		Weiland Thomas
<a href="#"><u>CNRS-LPSC</u></a>	Baylac Maud	<a href="#"><u>TUBE</u></a>	Bruns Warner
<a href="#"><u>CSIC - IFIC</u></a>	Faus Golfe Angeles		Henke Heino
<a href="#"><u>DESY</u></a>	Mais Helmut	<a href="#"><u>UJF</u></a>	De Conto Jean-Marie
<a href="#"><u>FNAL</u></a>	Bhat Chandra	<a href="#"><u>UOM</u></a>	Sammot Nicholas
	Sen Tanaji	<a href="#"><u>UPSA</u></a>	Ekelof Tord
	Shiltsev Vladimir	<a href="#"><u>USAN</u></a>	Petracca Stefania
	Valishev Alexander		



# AccNet RFTech institutes & contacts

Institute	Name
<a href="#">BESSY Berlin</a>	Knobloch Jens
<a href="#">BNL</a>	Ben-Zvi Ilan
	Calaga Rama
<a href="#">CEA-DSM</a>	Chel Stéphane
	Daël Antoine
	Devanz Guillaume
<a href="#">CERN</a>	Duperrier Romuald
	Angoletta Maria Elena
	Brunner Olivier
	Calatroni Sergio
	Capatina Ofelia
	Chiaveri Enrico
	Garoby Roland
	Hofle Wolfgang
	Jensen Erk
	Junginger Tobias
	Montesinos Eric
	Ruber Roger
	Vretenar Maurizio
	Vullierme Bruno
Weingarten Wolfgang	
<a href="#">CI</a>	McIntosh Peter
<a href="#">CNRS-IPNO</a>	Bousson Sébastien
	Gardès Daniel
	Gassot Hui Min
<a href="#">CNRS-LAL</a>	Olry Guillaume
	Mouton Bernard
<a href="#">Darmstadt University-IKP</a>	Variola Alessandro
	Eichhorn Ralf

Institute	Name
<a href="#">WUT</a>	Czuba Krzysztof
<a href="#">DESY</a>	Elsen Eckhard
	Grecki Mariusz
	(Proch Dieter) (Simrock Stefan)
<a href="#">ESRF</a>	Jacob Jorn
<a href="#">FZD</a>	Teichert Jochen
<a href="#">Goettingen University</a>	Quadt Arnulf
<a href="#">GSI</a>	Huelsmann Peter
<a href="#">IFJ PAN</a>	Wierba Wojciech
<a href="#">INFN-LNF</a>	Ghigo Andrea
<a href="#">INFN-Milano</a>	Pagani Carlo
<a href="#">INFN-Roma</a>	Tazzari Sergio
<a href="#">Institute for Nuclear Studies, Swierk</a>	Nietubyc Robert
	Szcwinski Jaroslaw Wronka Slawomir
<a href="#">Karlsruhe University?</a>	Ustinov Alexey?
<a href="#">LPNHEP (IN2P3 Jussieu)</a>	Augustin Jean-Eudes Debu Pascal
<a href="#">Rostock University</a>	Glock Hans-Walter
	van Rienen Ursula
<a href="#">Royal Holloway</a>	Molloy Stephen
<a href="#">TEMF Darmstadt</a>	Mueller Wolfgang
	Weiland Thomas
<a href="#">TUL</a>	Makowski Dariusz
	Napieralski Andrzej
	Smage Bogna
<a href="#">UFJ and LPSC</a>	De Conto Jean-Marie
<a href="#">Wuppertal University</a>	Mueller Guenter

# AccNet EuroNNAc institutes & contacts

Europe	Name			Affiliation
<b>EuCARD, CERN</b>	Dr.	Assmann*	Ralph	EuCARD/CERN
	Dr.	Geschonke	Gunther	CERN
	Dr.	Koutchouk	Jean-Pierre	EuCARD/CERN
	Dr.	Zimmermann	Frank	EuCARD/CERN
<b>France</b>	Dr.	Cros	Brigitte	LPGP -CNRS
	Prof. Dr.	Malka	Viktor	LOA
	Dr.	Martin	Philippe	CEA
	Prof. Dr.	Mourou	Gerard	ILE
	Dr.	Specka	Arnd	Ecole polytechnique
	Dr.	Videau*	Henri	Ecole polytechnique
<b>Germany</b>	Prof. Dr.	Caldwell	Allen	MPI-P Muenchen
	Dr.	Floettmann	Klaus	DESY
	Prof. Dr.	Gruener	Florian	LMU Muenchen/MPQ
	Dr.	Osterhoff*	Jens	University Hamburg, DESY
	Prof. Dr.	Sauerbrey	Roland	FZD Rossendorf
<b>Italy</b>	Dr.	Ferrario	Massimo	LNF
	Dr.	Ghigo	Andrea	INFN Frascati
	Prof. Dr.	Guiletti	Danilo	INFN Frascati
	Dr.	Serafini	Luca	INFN Frascati
<b>Portugal</b>	Prof. Dr.	Mendonca	Jose Tito	Instituto Superior Tecnico
<b>Russia</b>	Dr.	Kostyukov	Igor	Institute of Applied Physics
<b>Sweden</b>	Prof. Dr.	Wahlstroem	Claes-Goran	Lund University
<b>Switzerland</b>	Prof. Dr.	Rivkin	Leonid	EPFL, PSI
<b>United Kingdom</b>	Prof. Dr.	Jaroszynski	Dino	University of Strathclyde
	Dr.	Najmudin	Zulfikar	Imperial College
	Prof. Dr.	Neely	David	Rutherford Appleton Lab
	Prof. Dr.	Seryi	Andrei	John Adams Institute

\*Coordinators

Status 11.1.2011

Non-Europe	Name			Affiliation
<b>China</b>	Prof. Dr.	Sheng	Zhengming	Institute of Physics, CAS
<b>India</b>	Dr.	Naik	Prasad	RRCAT
<b>Japan</b>	Prof. Dr.	Yokoya	Kaoru	KEK
<b>United States</b>	Prof. Dr.	Chou	Weiren	ICFA/Fermilab
	Prof. Dr.	Joshi	Chan	University of California
	Prof. Dr.	Katsouleas	Thomas	Duke University
	Dr.	Leemans	Wim	LBNL
	Prof. Dr.	Muggli	Patric	USC
	Prof. Dr.	Raubenheimer	Tor	SLAC
	Prof. Dr.	Tajima	Toshiki	ICUIL/LMU