



European Coordination for Accelerator Research and Development

PUBLICATION

EuCARD WP4 Accelerator Networks

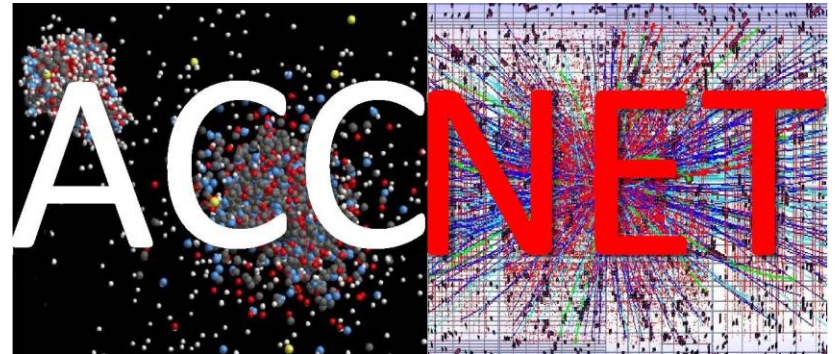
Zimmermann, F (CERN) *et al*

28 October 2010

The research leading to these results has received funding from the European Commission under the FP7 Research Infrastructures project EuCARD, grant agreement no. 227579.

This work is part of EuCARD Work Package 4: **AccNet: Accelerator Science Networks**.

The electronic version of this EuCARD Publication is available via the EuCARD web site <<http://cern.ch/eucard>> or on the CERN Document Server at the following URL :
<<http://cdsweb.cern.ch/record/1302996>>



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

6th EuCARD Steering Committee Meeting
Malta, 12 October 2010

outline

- WP structure & changes
- workshops
- publications & talks
- achievements
- milestones
- deliverables
- issues
- use of resources



ACCNET



Accelerator Science Networks



Coordination & Management

coordinated by

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

April 2010 changes:
Alessandro Variola
resigns; Walter
Scandale changes
affiliation to IN2P3-
CNRS, new coordinator
Peter Spiller joins



EUROLUMI

*accelerators & colliders
performance*

coordinated by

Frank Zimmermann, CERN
Ezio Todesco, CERN



RFTECH

sc & nc rf technologies

coordinated by

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



ACCNET - new



Accelerator Science Networks

PWAN - Plasma Wakefield Acceleration Netw.

coordinated by

Ralph Assmann, CERN ;

Jens Osterhoff, DESY

MAN? – Medical Accelerator Network

coordinated by

Jean-Pierre Koutchouk, CERN

AccNet Coordinators



EuroLumi

11.-12.03.2010 Workshop on Proton Driven Plasma Wake Field Acceleration at CERN

- plan, layout, simulations for first demonstration experiment w. SPS or PS proton beam

Channeling conference in Ferrara, October 2010; co-sponsored

AccNet EuroLumi **First Workshop on a Higher-Energy LHC** (HE-LHC'10), Malta, October 2010

- 20-T magnets
- beam dynamics (synchrotron radiation, beam-beam, IBS)
- injector upgrade

Crystal Collimation workshop, CERN, 25-26 October 2010

- results and plans of UA9; SPS crystal collimation experiments

4th AccNet-EuroLumi **Workshop on LHC Crab Cavities**, LHC-CC10, CERN, December 2010

- strategy for LHC crab cavities, cavity designs
- crab-cavity test in the SPS, LHC machine protection

RFTech

- MIXDES 2010** (MIXed DESign of integrated circuits and systems) conference in Wrocław (Poland), June 2010; co-sponsored
- “xTCA” part organized by Dr Makowski (Lodz University) and by Dr Simrock (ITER)
 - development of instrumentation applied in High Energy Physics. Aims: high reliability, availability and serviceability. Several standards (MTCA, ATCA or AMC) under development, using high-speed serial interfaces. xTCA objective: simplify application of MTCA and ATCA hardware in high energy physics applications.

French “Grand Emprunt”: Thanks to RFTech and after fruitful exchanges with CERN, proposals for EQUIPEX label (“EQUIpelement d’EXcellence”) and LABEX label (“LABoratoire d’EXcellence”) on crab-cavity development. The submission of the EQUIPEX done in September. LABEX document is under preparation (to be completed by end of October).

- Next RFTech workshop** will be held at PSI Villigen (Switzerland) on 2-3 December.
- preliminary scientific program focuses on RF cavity and coupler design (crab cavity design, SC/NC cavity development, power couplers), Superconducting RF (RF control, piezo control of detuning, infrastructures), Low-level and high-power RF systems (new electronics for LLRF, klystrons, solid state amplifiers), costing tools and reliability

PWAN – *Plasma Wakefield Acceleration*

Coordinator Ralph Assmann, deputy Jens Osterhoff

web site established 29.09.2010:

<https://espace.cern.ch/pwfa-network>

Scientific Steering Board, Network Coordination

generation and acceleration of GeV-class e-/e+ beams

- 1) **comparison of different methods** to drive plasma wakefields
- 2) **description of required R&D** for verifying various technologies
- 3) **roadmap towards a possible PWFA test facility with first test applications** (medical, synchrotron, ultra-fast science).
- 4) **roadmap towards high energy physics applications**
- 5) **coordination of European expertise** towards test facilities

MAN? – *Medical Accelerators*

triggered by discussions with U. Amaldi and by AccNet co-sponsored *Physics for Health* conference

status (October 2010)

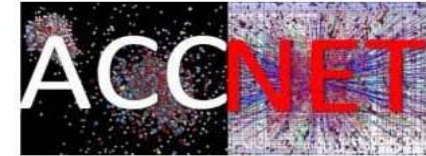
“For the network on medical accelerators, a description of the goals and deliverables was prepared and is in discussion with the coordinator of the EU-sponsored medical network to ensure complementarity and avoidance of duplications.”

Jean-Pierre Koutchouk



Accelerator Science Networks

EuroLumi, PWAN and
RFTech



Workshops

| Main Objectives | Network Structure | Activity Reports | WP4 Collaboration Workspace | Job Opportunities | Workshops | Literature and Presentations | Links |
|---------------------------------|-----------------------------------|----------------------------------|---|-----------------------------------|-----------|--|-----------------------|
|---------------------------------|-----------------------------------|----------------------------------|---|-----------------------------------|-----------|--|-----------------------|

Future ACCNET workshops and meetings:

- 2-3 December 2010 ● [Second Annual RFTech Meeting, PSI](#) - *NEW!*
- 15-17 December 2010 ● [LHC-CC10, 4th LHC Crab Cavity Workshop](#), CERN - *NEW!*
- 25-26 October 2010 ● [Mini-Workshop on Crystal Collimation](#), CERN - *NEW!*
- 14-16 October 2010 ● [HE-LHC'10, Mini-Workshop on High-Energy LHC](#), Malta - *NEW!*

Past ACCNET workshops and meetings:

- 24-27 June 2010 ● [MIXDES2010](#), Wroclaw
- 29 March 2010 ● [First Annual RFTech Meeting](#), DESY
- 11-12 March 2010 ● [Workshop on Proton Driven Plasma Wake Field Acceleration](#), CERN
- 2-4 February 2010 ● [AccNet Co-Sponsored Workshop on "Physics for Health in Europe"](#), CERN
- 17-18 December 2009 ● [Working meeting on proton driven plasma acceleration PPA09](#) at CERN
- 9-10 November 2009 ● [EuCARD-AccNet-EuroLumi mini-Workshop on Crystal Collimation](#), at CERN
- 19-22 October 2009 ● [LLRF09, Low-Level Radio Frequency Workshop](#), KEK
- 12-13 October 2009 ● [ACCNET EUROLUMI Workshop on Anti E-Cloud Coatings that require no activation "AEC'09"](#), CERN
- 16-18 September 2009 ● [EuCARD-ACCNET Workshop on LHC Crab Cavities "LHC-CC09"](#), organized jointly with [CERN](#), [US-LARP](#), [DL/CI](#), and [KEK](#), at CERN

past AccNet workshops

03-08.10.2010 [AccNet co-sponsored Channeling 2010](#), Ferrara

24-27.06.2010 [MIXDES2010](#), Wroclaw

29.03. 2010 [First Annual RFTech Meeting](#), DESY

11-12. [Workshop on Proton Driven Plasma Wake Field](#)

03.2010 [Acceleration](#), CERN

2-4.02.2010 [AccNet Co-Sponsored Workshop on "Physics for Health in Europe"](#), CERN

17-18.12. [Working meeting on proton driven plasma acceleration](#)
2009 [PPA09](#) at CERN

9-10.11. 2009 [EuCARD-AccNet-EuroLumi mini-Workshop on Crystal Collimation](#), at CERN

19-22.10.2009 [LLRF09, Low-Level Radio Frequency Workshop](#), KEK

12-13.10. 2009 [ACCNET EUROLUMI Workshop on Anti E-Cloud Coatings that require no activation "AEC'09"](#), CERN

16-18.09. 2009 [EuCARD-ACCNET Workshop on LHC Crab Cavities "LHC-CC09"](#), organized jointly with [CERN](#), [US-LARP](#), [DL/CI](#),

and [KEK](#) at CERN

MIXDES 2010



**Proceedings of the 17th International Conference
Mixed Design of Integrated Circuits and Systems
Wrocław, 24-26 June 2010**

Format: A4 Language: English

ISBN (Book): 978-83-928756-3-5

ISBN (CD): 978-83-928756-7-3

IEEE Catalog Number (Book): CFP10MIX-PRT

IEEE Catalog Number (CD): CFP10MIX-CDR

Foreword in Proceedings

"The xTCA for Instrumentation session has been organized in collaboration with the RFTech network of Work-Package 4 "AccNet" of the "European Coordination for Accelerator Research and Development" (EuCARD). EuCARD is an Integrating Activity co-funded by the European Commission under the Framework Programme 7, grant agreement no. 227579. The session has been partially sponsored by RFTech."

upcoming AccNet workshops

- | | |
|-----------------------|--|
| 14-16.10.2010 | <u>HE-LHC'10, Mini-Workshop on High-Energy LHC</u>, Malta |
| 25-26.10.2010 | <u>Mini-Workshop on Crystal Collimation</u>, CERN |
| 2-3.12.2010 | <u>Second Annual RFTech Meeting</u>, PSI |
| 15-17.12. 2010 | <u>LHC-CC10, 4th LHC Crab Cavity Workshop</u>, CERN |
| 16-18.06.2011 | <u>AccNet co-sponsored MIXDES 2011</u>, Gliwice |



18th International Conference Mixed Design of Integrated Circuits and Systems

Gliwice, 16-18 June 2011



Home News My Data Shop About Login

MIXDES - News

Receipt of papers (141 days to deadline)

MIXDES 2011

Today (247 days to conference)

General Information

Organisers
Deadlines
Venue & accommodation
Travel arrangement
Inquiries

News

Jun 28th, 2010: MIXDES 2010 Organising Committee would like to thank all the participants for attending the conference. In a few days the photos taken during the Conference will be available in [Photo gallery](#). The participants' photos taken during the conference are welcome to be published on the conference website.

Registration

Login
Site registration
Price policy

MIXDES 2011

Topics

MIXDES Exhibitions

Become an exhibitor

MIXDES 2010
Exhibitors



History

MixVLSI'94
MixVLSI'95
MIXDES'96
MIXDES'97
MIXDES'98
MIXDES'99
MIXDES 2000
MIXDES 2001
MIXDES 2002
MIXDES 2003
MIXDES 2004
MIXDES 2005
MIXDES 2006
MIXDES 2007
MIXDES 2008
MIXDES 2009
MIXDES 2010

[Photo gallery](#)

The Conference

The MIXDES conference series started in Debe near Warsaw in 1994 and has been organized yearly in different Polish cities. This year we would like to continue the tradition of inviting you to the most attractive places in Poland and the will take place in Gliwice.

The aim of the MIXDES conference is to provide an annual Central-European forum for the presentation and discussion of recent advances in design, modeling, simulation, testing and manufacturing in various areas such as micro- and nanoelectronics, semiconductors, sensors, actuators and power devices.

The MIXDES conference papers are indexed in Thomson Reuters **Conference Proceedings Citation Index** and available in **IEEE Xplore** since MIXDES 2005.

The topics of the MIXDES 2011 Conference include:

- 1. Design of Integrated Circuits and Microsystems**
Design methodologies. Digital and analog synthesis. Hardware-software codesign. Reconfigurable hardware. Hardware description languages. Intellectual property-based design. Design reuse.
- 2. Thermal Issues in Microelectronics**
Thermal and electro-thermal modelling, simulation methods and tools. Thermal mapping. Thermal protection circuits.
- 3. Analysis and Modelling of ICs and Microsystems**
Simulation methods and algorithms. Behavioural modelling with VHDL-AMS and other advanced modelling languages. Microsystems modelling. Model reduction. Parameter identification.
- 4. Microelectronics Technology and Packaging**
New microelectronic technologies. Packaging. Sensors and actuators.
- 5. Testing and Reliability**
Design for testability and manufacturability. Measurement instruments and techniques.
- 6. Power Electronics**
Design, manufacturing, and simulation of power semiconductor devices. Hybrid and monolithic Smart Power circuits. Power integration.
- 7. Signal Processing**
Digital and analogue filters, telecommunication circuits. Neural networks. Artificial intelligence. Fuzzy logic. Low voltage and low power solutions.
- 8. Embedded Systems**
Design, verification and applications.
- 9. Medical Applications**
Medical and biotechnology applications. Thermography in medicine.
- 10. Student Projects**

Paper preparation

Paper formatting
Publication rules
Presentation rules
Copyright Transfer
Form

MIXDES References

Conference
Proceedings Citation
Index



List of Conferences
1998-2010

IEEE Xplore Database



[Search results](#)

AccNet publications

AccNet dissemination & outreach

- two **articles in 2nd EuCARD newsletter** (on LHC-CC09 + AccNet & on concept of proton plasma acceleration)
- one **article in CERN Courier** Feb. 2010 (on PPA'09 workshop)
- three **seminar talks** at DESY, KEK and University of Heidelberg
- CERN **Academic Training lecture series on LHC upgrade**
- presentations at **ATLAS & CMS upgrade weeks** and to **LHCC**
- presentations at **Chamonix'2010 LHC Performance Workshop** and to **LHC Upgrade Task Force**
- various collaboration meetings

EuCARD AccNet documents

- about 40 in total, including
 - **2 journal articles**
 - **15 conference presentations**
 - **1 PhD thesis**
 - **1 master thesis**

AccNet publications & talks – 1

F. Zimmermann, CERN, “[CERN Upgrade Plans for the LHC and Its Injectors](#)”,
Proceedings **EPS HEP2009** Krakow 17 July 2009

C. Bhat, FNAL; F. Caspers, H. Damerau, S. Hancock, E. Mahner, F. Zimmermann,
CERN, “[Stabilizing Effect of a Double-Harmonic RF System in the CERN PS](#)”, **PAC'09**
Vancouver

R. Calaga, R. De-Maria, BNL; R. Assmann, J. Barranco, F. Caspers, E. Ciapala, T.
Linnecar, E. Metral, Y. Sun, R. Tomas, J. Tuckmantel, T. Weiler, F. Zimmermann, CERN;
N. Solyak, V. Yakovlev, FNAL; Y. Funakoshi, N. Kota, O. Yukioshi, A. Morita, Y. Morita,
KEK; G. Burt, Lancaster U; J. Qiang, LBNL; P. A. McIntosh, DL/ASTeC); A. Seryi, Z. Li,
L. Xiao, SLAC, “[Status of LHC Crab Cavity Simulations and Beam Studies](#)”, **PAC'09**
Vancouver

Y.-P. Sun, F. Zimmermann, R. Tomas, “[Tune Shift Due to Crossing Collision and Crab
Collision](#)”, **PAC'09 Vancouver**

Y.-P. Sun, R. Assmann, J. Barranco, R. Tomas, T. Weiler, F. Zimmermann, CERN; R.
Calaga, BNL; A. Morita, KEK, “[Study with One Local Crab Cavity at IR4 for LHC](#)”,
PAC'09 Vancouver

J.P. Koutchouk, F. Zimmermann, “[LHC Upgrade Scenarios](#)”, **PAC'09 Vancouver**

AccNet publications & talks – 2

Krzysztof Czuba, [Timing and Synchronization \(Tutorial/Overview\)](#), **LLRF09**, Tsukuba, 19-22 October 2009

M. Grecki, [Piezo Control for LFD Compensation](#), **LLRF09**, Tsukuba, 19-22 October 2009

Waldemar Koprek, [ACTA-based LLRF System for XFEL - Demonstration at FLASH](#), **LLRF09**, Tsukuba, 19-22 October 2009

C. Bhat, [LPA Scheme for the LHC Luminosity Upgrade \(updated pdf\)](#), **CERN Accelerator Physics Forum** 13 August 2009

H. Maury Cuna, [Study of the Heat Load due to the Electron Cloud in the LHC and in Higher-Luminosity LHC Extensions](#), **Master Thesis** U. Merida, August 2009

H. Maury Cuna, [Study of the Electron Cloud Heat Load in the LHC](#), CERN LCU Meeting, 28 July 2009

Yi-Peng Sun (孙一鹏), Ralph Assmann, Javier Barranco, Rogelio Tomás, Thomas Weiler, Frank Zimmermann, Rama Calaga, Akio Morita (森田 昭夫), [Beam dynamics aspects of crab cavities in the CERN Large Hadron Collider](#), **Phys. Rev. ST Accel. Beams** **12**, 101002 (2009)

AccNet publications & talks – 3

- G. Sterbini, Early Separation Scheme for LHC Luminosity Upgrade, **PhD Thesis**, EPFL
- F. Zimmermann, “Ingredients (necessary ones and desirable one) of a phase II upgrade,” **LHC Upgrade Task Force**, 26 February 2010
- F. Zimmermann, “Phase-2 Scenarios,” **LHCC Upgrade Review**, 16 February 2010
- F. Zimmermann, [Parameter space beyond \$10^{34}\$ \(paper\)](#), **LHC Performance workshop, Chamonix**, 25-29 January 2010
- F. Zimmermann, [Update on LHC Upgrade Plans](#), [ATLAS Upgrade Week](#), CERN, Tuesday 10 November 2009
- F. Zimmermann, A. Variola, W. Scandale, [EuCARD WP4 Accelerator Networks \(pdf\)](#), Report at 3rd **EuCARD Steering Committee Meeting** Frascati, 4 Nov. 2009
- Y.-P. Sun (孙一鹏), R. Assmann, R. Tomás, and F. Zimmermann, [Crab dispersion and its impact on the CERN Large Hadron Collider collimation](#), **Phys. Rev. ST Accel. Beams** **13, 031001 (2010)**
- Y.-P. Sun, B. Auchmann, S. Fartoukh, M. Giovannozzi, S. Russenschuck, R. Tomás, F. Zimmermann, Impact of CMS Stray Field on the Large Hadron Collider Beam Dynamics and Thin Solenoid in SixTrack, **LHC-Project-Note-426** (2009)

AccNet publications & talks – 4

R. Calaga, [LHC Crab Cavities](#), AccNet Highlight Talk at **First Annual EuCARD Meeting**, RAL, UK, 14 April 2010

A. Caldwell, [Proton Driven Plasma Wakefield Acceleration](#), AccNet Highlight Talk at **First Annual EuCARD Meeting**, RAL, UK, 14 April 2010

F. Zimmermann, [Machine Plans for Upgrades - “SLHC”-type Luminosities - Issues and Solutions](#), **CMS Upgrade Week**, CERN, 29 April 2010

Adam Piotrowski, [PCIExpress Hot-Plug Mechanism in Linux-based ATCA Control Systems](#) ([word summary](#)), **MIXDES 2010**, Wroclaw, 26-27 June 2010

Konrad Przygoda, [Power Supply Unit for ATCA-based Piezo Compensation System](#) ([word summary](#)), **MIXDES 2010**, Wroclaw, 26-27 June 2010

Samer Bou Habib, [Design of Eight-channel ADC Card for GHz Signal Conversion](#) ([word summary](#)), **MIXDES 2010**, Wroclaw, 26-27 June 2010

Jan Wychowaniak, [Application for Management and Monitoring of xTCA Hardware](#) ([word summary](#)), **MIXDES 2010**, Wroclaw, 26-27 June 2010

AccNet publications & talks – 5

Tomasz Kozak, [AMC Radiation Monitoring Module for ATCA/ \$\mu\$ TCA Based Low Level RF Control System, 17th International Conference Mixed Design of Integrated Circuits and Systems \(word summary\)](#), **MIXDES 2010**, Wroclaw, 24-26 June 2010

Piotr Perek, [ATCA Carrier Board with Dedicated IPMI Controller \(1\)](#), **MIXDES 2010**, Wroclaw, 26-27 June 2010

Pawel Predki, [ATCA Carrier Board with Dedicated IPMI Controller \(2\)](#), **MIXDES 2010**, Wroclaw, 26-27 June 2010

F. Zimmermann, [LHC Beyond 2020](#), **KEK Accelerator Seminar**, Kobayashi Hall, 14 July 2010

K. Ohmi, [Beam-Beam Studies for the High-Luminosity and High-Energy LHC Plus Related Issues for KEKB](#), 24 August 2010

B. Yee Rendon, [Setting up Simulations of Failure Scenarios for a Crab Cavity in the Nominal LHC](#), CERN, 22 September 2010

B. Yee Rendon, [Manual of Crab-Cavity Analysis Tools](#), [Crab cavity Voltage Calculation](#), [Setting Up Simulations of Failure Scenarios for a Crab Cavity in the Nominal LHC](#), CERN, September 2010

AccNet achievements - facts

expanded scope (1-2 new networks)

organized or co-organized **13 workshops**

> **41 talks and papers,**

incl. 1 master thesis & 1 PhD thesis

visitor exchanges & student support

(e.g. K. Ohmi, B. Yee, H. Maury, 2 diploma students
& 5 PhD students 6 from Lodz & Warsaw for
MIXDES10, G. Hoffstaetter, J. Schwartz, E. Tsyganov)

collaboration with ***CINVESTAV Mexico***

incl. 1 master student & 1 PhD student

AccNet achievements - view

- ***catalyzer for LHC upgrades & FAIR***
 - ***crab cavities (!)***, magnets, collimations,...
 - large Piwinski angle
 - ***high energy LHC*** (new initiative)
- ***advanced concepts & synergies***
 - ***e-cloud assessment & mitigation***
 - ***plasma acceleration, medical accelerators, crystal collimation***
- ***community organizer***
 - RFTech

AccNet-CINVESTAV collaboration: electron cloud (H. Maury)

Simulations of Electron-Cloud Heat Load for the Cold Arcs of the LHC and Its High-Luminosity Upgrade Scenarios

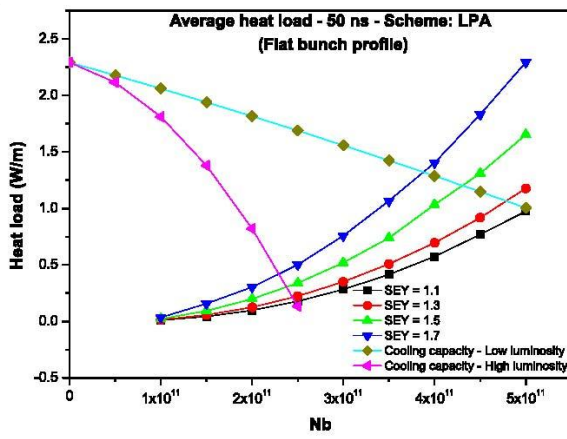
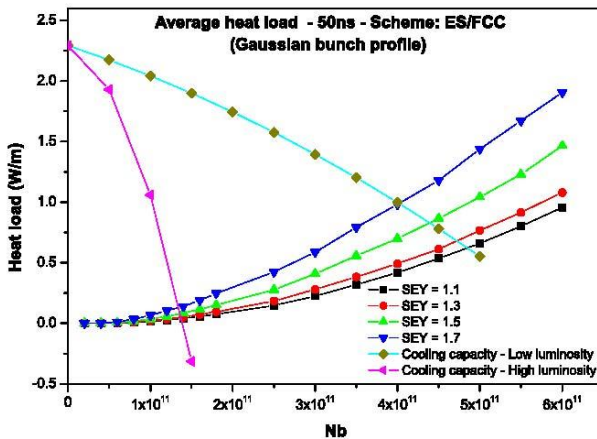
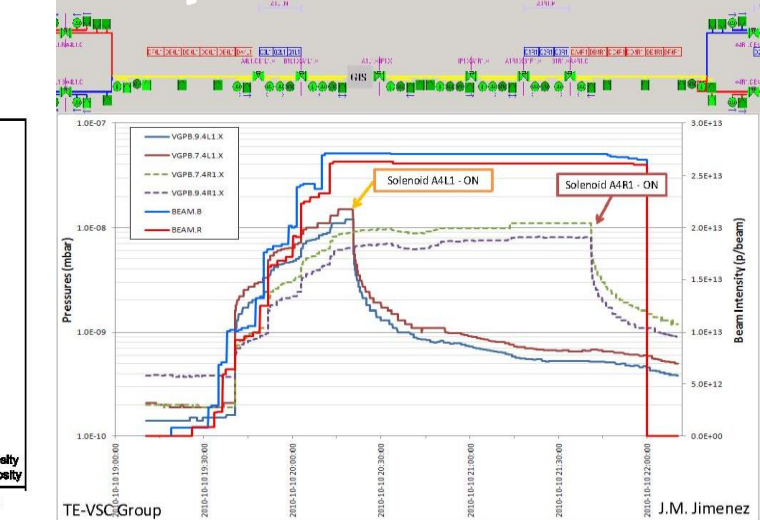
Humberto Maury Cuna and Jesus Guillermo Contreras Nuño
 Departamento de Fisica Aplicada, CINVESTAV-IPN,
 Unidad Mérida, A.P. 73 Cordemex, 97310 Mérida, Yucatán, México

Frank Zimmermann
 CERN, BE Department, 1211 Geneva 23, Switzerland
 (Dated: September 25, 2010)

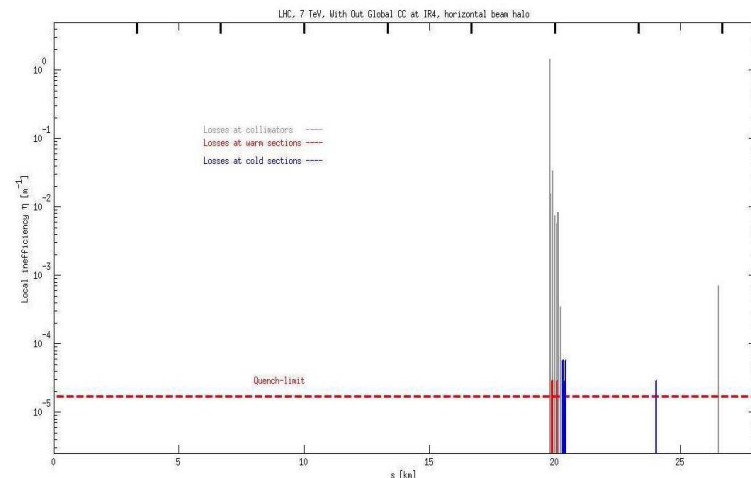
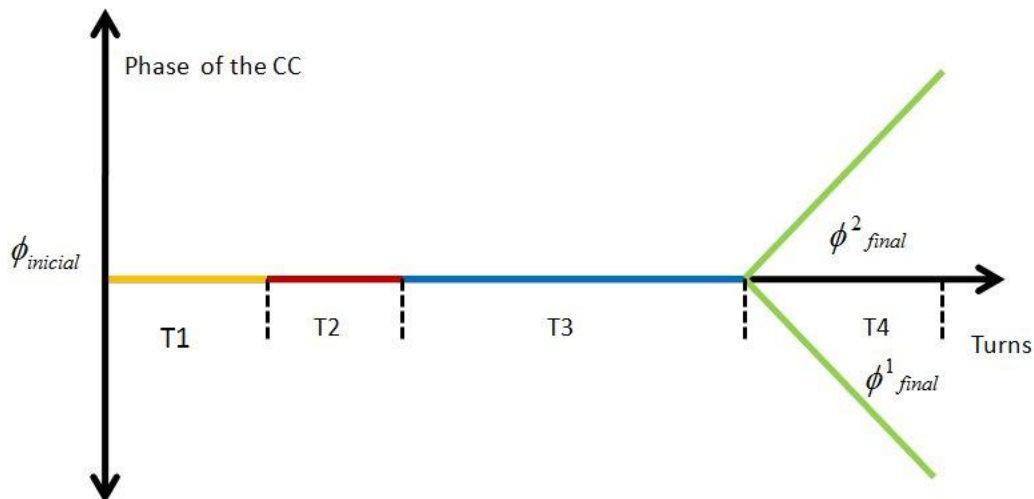
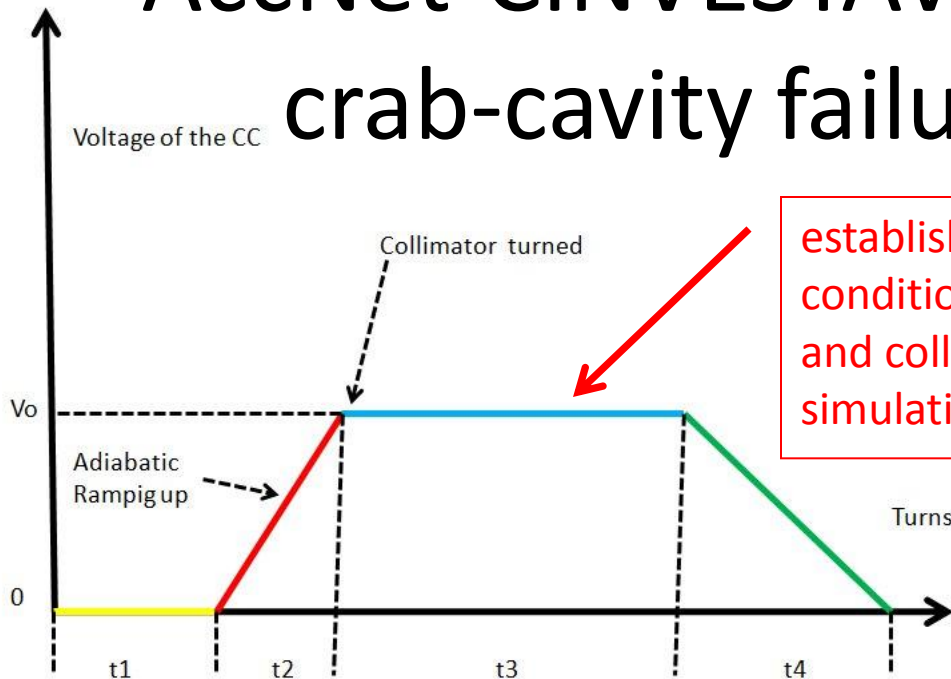
paper in preparation

The heat load generated by an electron cloud in the cold arcs of the Large Hadron Collider (LHC) is a concern for operation at 7 TeV and beyond nominal beam current. We report the results of simulation studies, with updated secondary-emission models, which examine the severity of the electron heat load over a range of possible operation parameters, both for the nominal LHC and for various luminosity-upgrade scenarios, such as the so-called full crab crossing and early separation schemes, the large Piwinski angle scheme and a variant of the latter, providing compatibility with the (upgraded) LHCb experiment. The variable parameters considered are the maximum secondary emission yield, the number of particles per bunch, and the spacing between bunches. In addition, the dependence of the heat load on the bunch length and on the longitudinal bunch profile is investigated.

Solenoids between DFBX and D1 in IR1L



AccNet-CINVESTAV collaboration: crab-cavity failures (B. Yee)



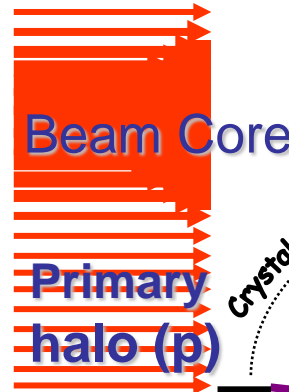
Local loss map for nominal LHC (top energy, $\beta^*(IP5) = 0.55$) with one GCC and horizontal beam halo, when the phase of the CC is changed by 50° in 1 turn.

UA9 crystal-collimation result in 2010 (W. Scandale)

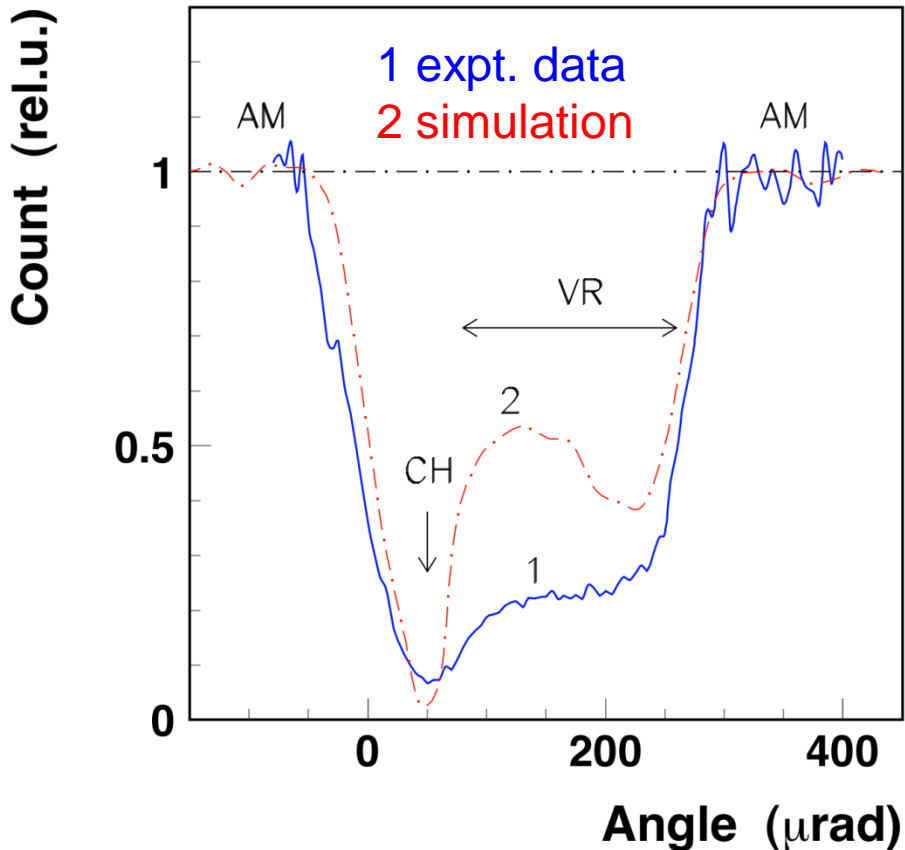
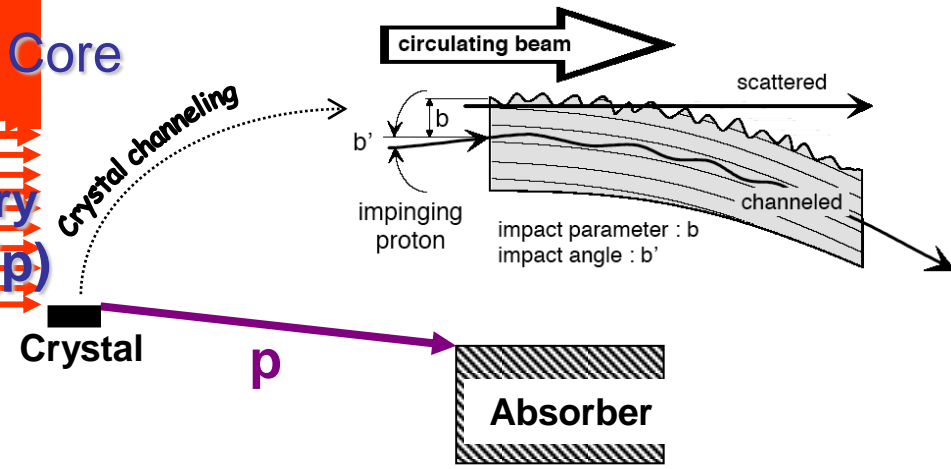
Angular scan of crystal 3

Crystal

- ◆ with a small residual torsion
- ◆ mounted on the IHEP high quality goniometer

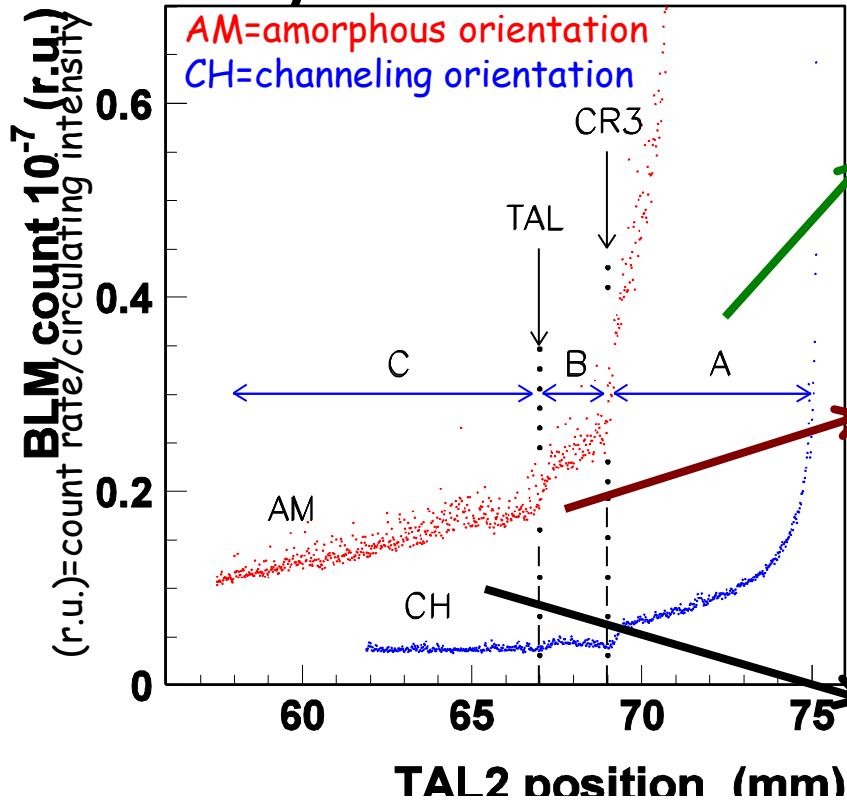


E. Tsyganov & A. Taratin (1991)



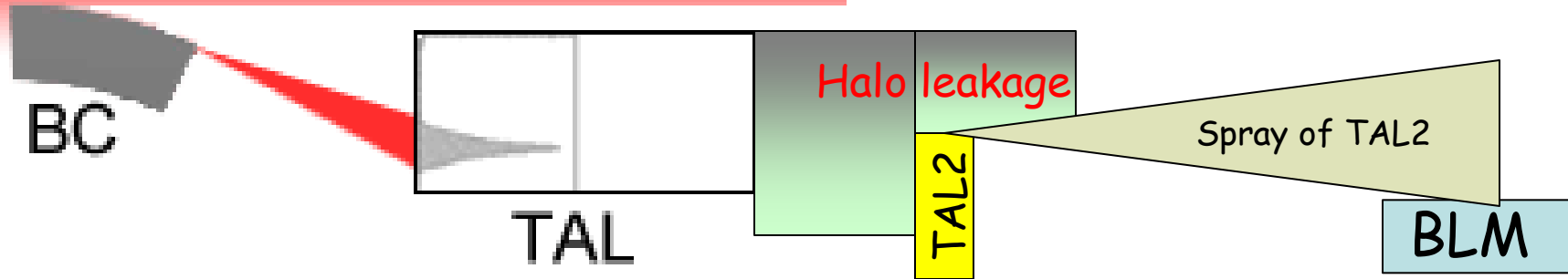
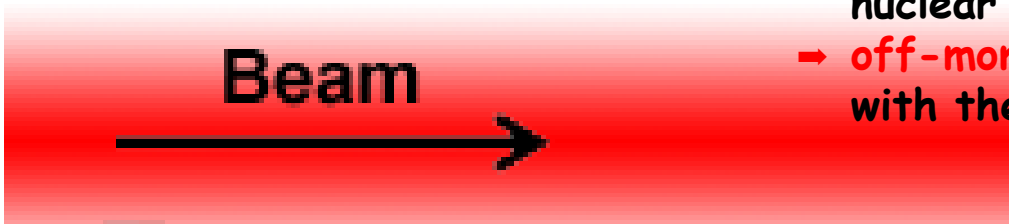
- ◆ Loss reduction in channeling mode ($\times 16$)
 - ◆ larger than in MonteCarlo simulation ($\times 33$)
 - ◆ larger than in crystal 1 ($\times 5$)
- ◆ Small variations of the deflection angle in different scans [better control of the alignment errors]

UA9 crystal-collimation result in 2010 (W. Scandale)



Collimation leakage in dispersive area

- ◆ A) tail of the circulating beam
 - fast depletion in channeling mode
 - linear descent of the population in amorphous orientation (or with the tungsten scatterer)
- ◆ B) multiple Coulomb scattering area
 - fast depletion by high probability of prompt channeling at the first crystal hit
 - slow depletion due to multi-turn hits of the amorphous primary (very slow extraction)
- ◆ C) shadow of the absorber
 - low population due to low probability of nuclear interaction in channeling mode
 - off-momentum halo due to diffractive hits with the amorphous primary and TAL



AccNet milestones

M.4.1.1

- Second **general AccNet Steering meeting**, RAL, UK, 13 April 2010

M4.2.1:

- many **topical mini-workshops** have been organized and supported
- **first major EuroLumi workshop is HE-LHC'10 in Oct. 2010**
- another EuroLumi workshop is **LHC-CC10 in Dec. 2010**

M4.3.1:

- Annual **RFTECH workshop was held at DESY, 29 March 2010**
- **Next RFTech workshop at PSI, 2-3 December 2010**

2nd general AccNet Steering meeting, RAL, 13 April 2010



first major EuroLumi workshop:

HE-LHC'10 in Oct. 2010

55 participants

EuCARD-AccNet mini-workshop on a higher-energy LHC "HE-LHC'10" - 14-16 October '10

Scope:

This mini-workshop will take a first look at a higher-energy LHC (HE-LHC) with about 16.5 TeV beam energy and 20-T dipole magnets, in particular at parameters, luminosity optimization, operation mode, beam dynamics, injector, magnets (for arcs, insertions and injector), cryogenics, collimation, and vacuum system.

Composition of the programme committee:

Oliver Bruning (CERN), Antoine Dael (CEA), Gijs de Rijk (CERN), Steve Gourlay (LBNL), Jean-Pierre Koutchouk (CERN), Steve Myers (CERN, **Chair**), Eric Prebys (FNAL & US-LARP), Peter Spiller (GSI), Lucio Rossi (CERN), Nicholas Sammut (U Malta), Walter Scandale (IN2P3), Vladimir Shiltsev (FNAL), Ezio Todesco (CERN), Akira Yamamoto (KEK), Frank Zimmermann (CERN).

General goals:

- Investigate critical questions for HE-LHC and propose solutions or follow-up
- Document the HE-LHC concepts for future reference
- initiate collaborative work around HELHC challenges amongst CERN, EuCARD partners, US, and KEK
- Generate and/or identify synergies with FAIR and past VLHC studies

Workshop secretariat & travel organization: Merethe Morer-Olafsen

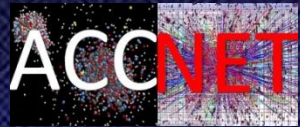
Written **proceedings** edited by Ezio Todesco and Frank Zimmermann, contributions by 31. December 2010

Place and date:

Malta, Villa Bigli, Headquarters of the Malta Council for Science and Technology, 14-16 October 2010



First Annual RFTech Meeting



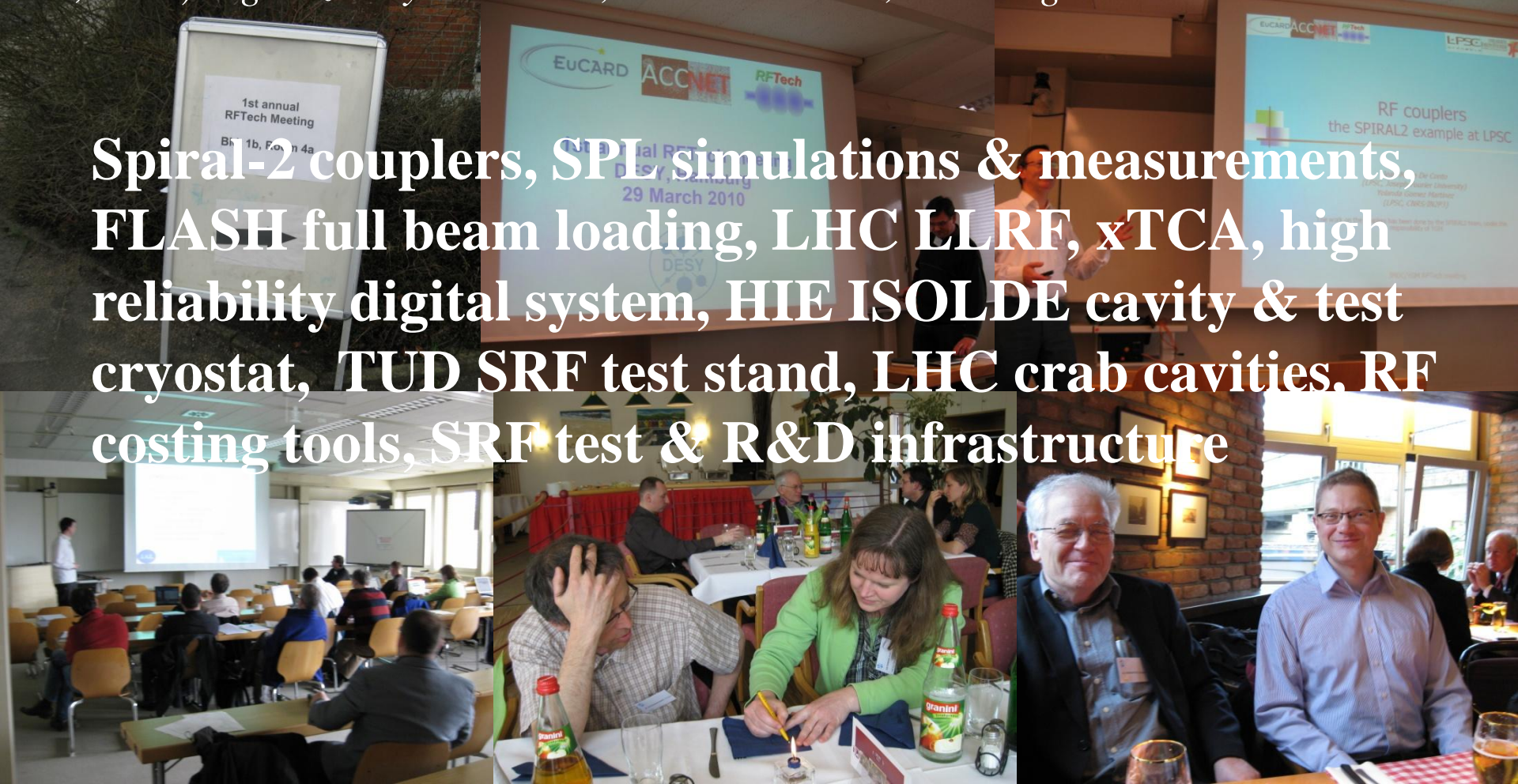
DESY, 29 March 2010



<https://indico.desy.de/conferenceDisplay.py?confId=2831>

17 participants (DESY, CERN, TUD, UROS, ASTeC, LPSC, UFJ, ESS, U London, TUL, UG, SINS) organized by M. Grecki, J.-M. De Conto, W. Weingarten & DESY

Spiral-2 couplers, SPI simulations & measurements, FLASH full beam loading, LHC LLRF, xTCA, high reliability digital system, HIE ISOLDE cavity & test cryostat, TUD SRF test stand, LHC crab cavities, RF costing tools, SRF test & R&D infrastructure



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 | on track? |
| 4.3.3 | RFTECH strategy/result for cavity design, LLRF & HPRF systems and design integration, and costing tools | R | M48 | on track |

AccNet issues - 1

- ***inclusion of AccNet papers & talks in EuCARD database*** (secretarial support!?, access rights, duplication, simplicity) automatic email approval? (never!), 17 entries??. WP4 in CDS



example of merger in CDS EuCARD & sLHC

Home > [EuCARD Publications](#) > Search Results

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| All of the words: | <input type="text" value="koutchouk"/> | <input type="text" value="author"/> | <input type="text" value="AND"/> |
| All of the words: | <input type="text" value="zimmermann"/> | <input type="text" value="author"/> | |

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|--|-----------------------------------|--|--|--|---|

EuCARD Publications

1 records found

Search took 0.11 seconds.

- 1. **LHC Upgrade Scenarios** / [Koutchouk, Jean-Pierre](#) (CERN); [Zimmermann, Frank](#) (CERN)
An LHC high-luminosity upgrade has been studied by various European and international collaborations since about 2001.
[...]
sLHC-PROJECT-Report-0013 ; CERN-sLHC-PROJECT-Report-0013 ; EuCARD-CON-2009-007 . - 2009. - 6 p.
[EuCARD Fulltext](#) - [sLHC Fulltext](#)
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| All of the words: | <input type="text"/> | any field | AND |
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|---------------------|---|
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Display results:

Output format:

| | | | | |
|---------|------|------------|----------|------------|
| by name | date | created by | language | HTML brief |
|---------|------|------------|----------|------------|

EuCARD Publications 120 records found 1 - 10 >>> jump to record: Search took 0.01 seconds.

- 1. **First Beam Spectra of SC Third Harmonic Cavity at FLASH** / [Zhang, P](#) (The University of Manchester;The Cockcroft Institute of Accelerator Science and Technology;DESY) ; [Baboi, N](#) (DESY) ; [Elisgen, T](#) (Universität Rostock) ; [Glock, H.W](#) (Universität Rostock) ; [Jones, R.M](#) (The University of Manchester;The Cockcroft Institute of Accelerator Science and Technology) ; [Lorbeer, B](#) (DESY) ; [Rienen, U.V](#) (Universität Rostock) ; [Shinton, I.R.R](#) (The University of Manchester;The Cockcroft Institute of Accelerator Science and Technology)
WP: 10: SC RF technology for higher intensity proton accelerators and higher energy electron linacs
Task: 10.5: HOM Distribution

Third harmonic superconducting cavities have been designed and fabricated by FNAL to minimise the energy spread along bunches in the FLASH facility at DESY. [...]

EuCARD-CON-2010-026. - 2010.

[Access to fulltext document](#)

[Detailed record](#) - [Similar records](#)

- 2. **A sensitivity analysis for the stabilization of the CLIC main beam quadrupoles** / [Janssens, S](#) (CERN) ; [Collette, C](#) (CERN) ; [Artoos, K](#) (CERN) ; [Fernandez Carmona, P](#) (CERN) ; [Hauviller, C](#) (CERN)
WP: 9: Technology for normal conducting higher energy linear accelerators
Task: 9.3: Linac & FF Stabilization

In particle colliders (like the LHC), particles are highly accelerated in a circular beam pipe before the collision. [...]

EuCARD-CON-2010-025. - 2010.

[Access to fulltext document](#)

[Detailed record](#) - [Similar records](#)

- 3. **CLIC quadrupole stabilization and nano-positioning** / [Collette, C](#) (CERN) ; [Janssens, S](#) (CERN) ; [Artoos, K](#) (CERN) ; [Fernandez Carmona, P](#) (CERN) ; [Guinchard, M](#) (CERN) ; [Hauviller, C](#) (CERN)

in CDS
there is
no obvious
way to
look/search
for one
work
package

many WP4 documents which WP coordinator was/is not aware of, and which have not been listed on WP4 web site approval & qualification?

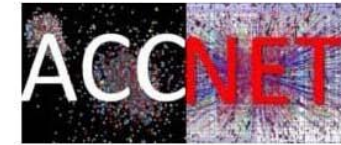
- 13. **Electronic system of the RPC Muon Trigger in CMS experiment at LHC accelerator (Elektroniczny system trygera mionowego RPC w eksperymencie CMS akceleratora LHC / Bialkowska_H** (Institute of Nuclear Problems, Swierk) ; [Bluj_M](#) (Institute of Nuclear Problems, Swierk) ; [Bunkowski_K](#) (Warsaw U.) ; [Czyrkowski_H](#) (Warsaw U.) ; [Cwiok_M](#) (Warsaw U.) ; [Dominik_W](#) (Warsaw U.) ; [Doroba_K](#) (Warsaw U.) ; [Fruboes_T](#) (Institute of Nuclear Problems, Swierk) ; [Gokieli_R](#) (Institute of Nuclear Problems, Swierk) ; [Gorski_M](#) (Institute of Nuclear Problems, Swierk) *et al.*
WP: 4: AccNet: Accelerator Science Networks
Task: 4.3: RFTech

This paper presents implementation of distributed, multichannel electronic measurement system for RPC - based Muon Trigger in the CMS experiment at LHC [...]
EuCARD-PUB-2009-016. - 2009.
[Access to fulltext document](#)
[Detailed record](#) - [Similar records](#)
- 14. **Stanowisko testowe z miedzianą strukturą typu TESLA (Test stand with copper TESLA structure) / Glowka_J** (Warsaw University of Technology) ; [Macias_M](#) (Warsaw University of Technology) ; [Czuba_K](#) (Warsaw University of technology) ; [Pozniak_K](#) (Warsaw University of technology) ; [Romaniuk_Ryszard](#) (Warsaw U. of Tech.)
WP: 4: AccNet: Accelerator Science Networks
Task: 4.3: RFTech

The paper presents preparation of a copper TESLA structure for the use in laboratory test stand. [...]
EuCARD-PUB-2009-015. - 2009.
[Access to fulltext document](#)
[Detailed record](#) - [Similar records](#)
- 15. **Development of laser technology in Poland / Gajda_J** (West Pomeranian University of Technology, Szczecin) ; [Romaniuk_Ryszard](#) (Warsaw U. of Tech.)
WP: 4: AccNet: Accelerator Science Networks
Task: 4.1: AccNet Coordination & Communication

The paper presents chosen development threads of laser technology and associated branches of optoelectronics in this country [...]
EuCARD-PUB-2009-014. - 2009.
[Access to fulltext document](#)
[Detailed record](#) - [Similar records](#)
- 16. **Photonics and Web Engineering: WILGA 2009 / Romaniuk_Ryszard** (Warsaw U. of Tech.)
WP: 4: AccNet: Accelerator Science Networks
Task: 4.1: AccNet Coordination & Communication

The paper is a digest of work presented during a cyclic Ph.D [...]
EuCARD-PUB-2009-013. - 2009.
[Access to fulltext document](#)
[Detailed record](#) - [Similar records](#)



all known WP4
AccNet
papers
&
presentations
are
posted on
LAL AccNet
web site

Literature and Presentations

| Main Objectives | Network Structure | Activity Reports | WP4 Collaboration Workspace | Job Opportunities | Workshops | Literature and Presentations | Links |
|---------------------------------|-----------------------------------|----------------------------------|---|-----------------------------------|---------------------------|--|-----------------------|
|---------------------------------|-----------------------------------|----------------------------------|---|-----------------------------------|---------------------------|--|-----------------------|

2010

B. Yee Rendon, [Setting up Simulations of Failure Scenarios for a Crab Cavity in the Nominal LHC](#), CERN, 22 September 2010

K. Ohmi, [Beam-Beam Studies for the High-Luminosity and High-Energy LHC Plus Related Issues for KEKB](#), 24 August 2010

F. Zimmermann, [LHC Beyond 2020](#), KEK Accelerator Seminar, Kobayashi Hall, 14 July 2010

Tomasz Kozak, [AMC Radiation Monitoring Module for ATCA/ATCA Based Low Level RF Control System, 17th International Conference Mixed Design of Integrated Circuits and Systems \(word summary\)](#), MIXDES 2010, Wroclaw, 24-26 June 2010

Piotr Perek, [ATCA Carrier Board with Dedicated IPMI Controller \(1\) \(word summary\)](#), MIXDES 2010, Wroclaw, 26-27 June 2010

Pawel Predki, [ATCA Carrier Board with Dedicated IPMI Controller \(2\) \(word summary\)](#), MIXDES 2010, Wroclaw, 26-27 June 2010

Adam Piotrowski, [PCIExpress Hot-Plug Mechanism in Linux-based ATCA Control Systems \(word summary\)](#), MIXDES 2010, Wroclaw, 26-27 June 2010

Konrad Przygoda, [Power Supply Unit for ATCA-based Piezo Compensation System \(word summary\)](#), MIXDES 2010, Wroclaw, 26-27 June 2010

Samer Bou Habib, [Design of Eight-channel ADC Card for GHz Signal Conversion \(word summary\)](#), MIXDES 2010, Wroclaw, 26-27 June 2010

Jan Wychowaniak, [Application for Management and Monitoring of xTCA Hardware \(word summary\)](#), MIXDES 2010, Wroclaw, 26-27 June 2010

F. Zimmermann, [Machine Plans for Upgrades - LHC-type Luminosities - Issues and Solutions](#), CMS Upgrade Week, CERN, 29 April 2010

A. Caldwell, [Proton Driven Plasma Wakefield Acceleration](#), AccNet Highlight Talk at First Annual EuCARD Meeting, RAL, UK, 14 April 2010

R. Calaga, [LHC Crab Cavities](#), AccNet Highlight Talk at First Annual EuCARD Meeting, RAL, UK, 14 April 2010

F. Zimmermann, [Report from EuCARD WP4 - Accelerator Networks](#), First Annual EuCARD Meeting, RAL, UK, 14 April 2010

AccNet issues – cont'd

- ***inclusion of AccNet papers & talks in EuCARD database*** (secretarial support!?, access rights, duplication, simplicity) automatic email approval? (never!), 17 entries??. WP4 in CDS
- ***web site editorial access*** for WP coordinator?!
server changes have hindered updates
- ***relation between AccNet and new HL-LHC project?***
- ***support for AccNet web site*** after
the step-down of A. Variola
and retirement of B. Mouton
- ***launch of network on medical accelerators?***
- ***budgets for PWAN and MAN***

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
- novel anti e-cloud coating techniques
- push for higher-energy LHC

high cost efficiency

exchange of 13 expert visitors

two theses, 6 conf. papers, 2 journal articles

AccNet conclusions

AccNet had an excellent start

EuroLumi gives input to LHC upgrade

Crab Cavity Advisory Board,
endorsement of LHC crab cavities,
task force preparing SPS crab-cavity tests,
“LPA” scenario, novel 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

Ambitious programme

Appendix

AccNet
institutes & contacts

AccNet EuroLumi institutes & contacts

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

AccNet RFTech institutes & contacts

| Institute | Name |
|--|-----------------------|
| <u>BESSY Berlin</u> | Knobloch Jens |
| <u>BNL</u> | Ben-Zvi Ilan |
| | Calaga Rama |
| <u>CEA-DSM</u> | Chel Stéphane |
| | Daël Antoine |
| | Devanz Guillaume |
| | Duperrier Romuald |
| <u>CERN</u> | 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 |
| <u>CI</u> | McIntosh Peter |
| <u>CNRS-IPNO</u> | Bousson Sébastien |
| | Gardès Daniel |
| | Gassot Hui Min |
| | Olry Guillaume |
| <u>CNRS-LAL</u> | Mouton Bernard |
| | Variola Alessandro |
| <u>Darmstadt University-IKP</u> | Eichhorn Ralf |

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