





#### Carsten P. Welsch

On behalf of the Consortium













# What is DITANET ?

- One of the largest Marie Curie Initial Training Networks ever funded by European Union !
- Funding for 20 fellows (17 ESR and 3 ER)
- Gives industry an important role !
- Recognition of importance of beam diagnostics at European level !

(in physics top 11, 2007 – under extreme competition)







Editor's Note: PDF version of slides from Beam Instrumentation Workshop 2010, Santa Fe, NM

# The DITANET Consortium











**Network Participants** 











**Associated Partners** 









## **Adjunct Partners**

### Part of the long term strategy – DITANET is growing









### FLAIR @ Facility for Antiproton and Ion Research







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# **USR – Diagnostics**









Harasimowicz, J., et al. Hyperfine Interact. (2009)

- Position
- Profile
- Intensity



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# USR – Gas Jet / ReMi



#### Least-destructive profile measurements



Investigations with the Gas Dynamics Tool (GDT)

#### Design realized in 2009, First tests mid 2010.

M. Putignano et al., Hyperfine Interact. (2009)





Massimiliano Putignano



The Cockcroft Institute of Accelerator Science and Technology



## HIT: <u>Heidelberg</u> <u>Ion Beam</u> <u>Therapy</u> Center

#### HIT is part of the University Hospital in Heidelberg





University Campus "Im Neuenheimer Feld"







# **HIT Facility**









# DITANET@HIT: The Project

#### Two lon sources and LEBT





TUPSM048

Calculating Emittance (in x)

Pepper pot measurement system for better beam characterization. <u>Challenge</u>: adaptation to very low energies and high intensities!

Marion Ripert







# LHC Synchrotron Light Monitors

### New implementations:

- Optical table 4.8m long
- Calibra
- Motoriz the Und increas
- Intensif





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## The Solution









## Intensity Modulated Radiation Therapy

#### Feasibility study of a novel method to obtain a map of doses in the pre-treatment of patients with IMRT

TAC of the detector inside the phantom



Primus linear accelerator



Collaboration between National Accelerators Center (CNA), department of atomic, molecular and nuclear physics, engineering school (University of Seville), hospital Virgen Macarena (Seville), Inabensa (ABENGOA) Company







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## **Dosimetric Sensor for IMRT**



Detector installed inside the phantom for the dosimetric characterization





In order to improve the actual spatial resolution future plans are oriented toward bi-dimensional silicon detectors







# Additional Projects

### Investigations into

- Halo Formation,
- Progagation;
- Light generation;
- Detection mechanisms.

#### WECNB03





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C.P. Welsch et al., Meas. Sci. Techn. **17** (2006) J. Egberts et al, JINST **5** P04010 (2010)

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# 1<sup>st</sup> DITANET School, March 2009

### Beam Diagnostics, held at RHUL, UK

> 70 participants and lecturers

Time	Monday	Tuesday	Wednesday-RAL	Thursday	Friday				
8:30 9:30		Definition of Particle Beams (C.P. Weisch)	Board coaches	Emittance (G. Blair)	Special Session - only for DITANET trainges -				
9:30 10:30		Current (J.C. Denard)	Transverse Beam Profile 1 (E. Bravin)	Position I (P. Forck)	Part. Detection (A. Drouart)				
11:00		Energy (S.Bernal)	Transverse Beam Profile 2	Position II (P. Forck)	e cloud Diagnostics				
12:00			(E. Bravin)		(M. Covo)				
12:00 13:00		Longitudinal Beam Profile I (T. Leftvre)	Beam Loss (Kay Wittenburg)	Tune (F. Zimmermann)	Industry I (Introduction, H. Smith, A. Beunas)				
		•							
14:30 15:30	Welcome / Introduction DITANET	Study Session split in smaller groups		Study Session split in smaller groups	Industry II (V. Häfling, T. Chapman C. Bocchetta)				
15:30 16:30	Introduction to Accelerators I (H.Wiedemann)	Longitudinal Beam Profile II (P. Karataev)	Visits	Poster Session	Conclusion				
· · · · ·									
17:00	Introduction to Accelerators II	Seminar: Appl. of Synchrotron Light		Seminar: Acc. for medical					
18:00	(H.Wiedemann)	(H.Wiedemann)		applications (A.Peters)					



March 2011





# 1<sup>st</sup> DITANET Topical Workshop

- Low Energy, Low Intensity Beam Diagnostics
- Hirschberg, Germany Nov 24<sup>th</sup>/25<sup>th</sup> 2009
- Good mix of DITANET and external researchers
- Discussion of state-of-the-art and future developments

CERN Indico: 93294



### Next workshop: July 12<sup>th</sup>/13<sup>th</sup> – get in touch !





## **Dissemination: DITANET Website**

#### UNIVERSITY OF LIVERPOOL

#### DITANET

You are here: University Home > DITANET home

DITANET home
Network structure
Vacancies
Documents News
Events
Beam Instrumentation Booklet Administration
Downloads Links

#### DITANET

The development of novel Diagnostic Techniques for future particle Accelerators is the goal of a new European Network (DITANET) that was installed within the Marie Curie ITN scheme.

Editor's Note: PDF version of slides from Beam Instrumentation Workshop 2010, Santa Fe, NM



University: <u>Home | A-Z Index</u> | <u>Staff | Students</u>

Without an adequate set of beam instrumentation,

SEARCH

f it is impossible to operate a particle accelerator - let alone optimize its performance.

#### News

The DITANET School on complementary skills took place at the University of Liverpool (UK) 15th-19th March 2010. Further information.

DITANET Prize - Winner 2010

Partners Area and DITANET Blog: Login to VOCAL In this frame, several major research centers, leading Universities, and partners from industry will develop beyond-state-of-the-art diagnostic techniques for future accelerator facilities and jointly train students and young researchers within a unique European structure.





### www.liv.ac.uk/ditanet







# **Quarterly Newsletter**

- Part of the dissemination strategy
- Contribution from all network partners
- Announcement and review of activities
- >400 recipients, growing

- Registration by Email.

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NEWSLETTER October 2009 Issue 1	DĽ	<b>FANE</b>	<b>T</b> ****		
Special Interest News: - Announcement of Annual DTANET Proc - Recent Publications - Individual Highlights - Recent Events - Recent Events - Solutions - New to the News to the	Welcome to the Description of the second second societator, they result accelerator, they result accelerator, they result and how to behaves in machine. Without an ap- propulse set of diagnost the impossible to operat- any accelerator comple- ted above optimize its per- turbance of the second termine of the second second provides a wide and soil pass of the training of young researchers. More results on any bear monitor or detector mer- and any table of the second provides a wide and soil pass of the training of young researchers. More results on the second second provides a wide and soil pass of the training of young researchers. More monitor or detector mer monitor or detector mer-	First Newsletter of searchers in this field, is of relevance far beyond the pure field of paticle ac- orderators. The Marie Curie Initial Training Network DirtAVET - Disposition of the Arrise Curie Initial Training Network Pathogenetic Curie Initial The Marie Curie Initial Training Network Accorderation - a european Method education the langest- ever EU funded education and oyung Postobos in beam instrumentation for accorderators with a project the accorderator partner in- stitutions, including un- ties, and private compa- ries. DITAVET has now the accorderator with a positive the comparison of the position the accorderator of the position of the position of the position	the EU liebuver. In the EU liebuver. In the sensing into a strength- which be existing links in the existing l	CANE'	T <sub>***</sub> *
Pakitations & 7 Notice Board 7	padorofa of the mitodox stator relation of the mitodox that training of young in DITANET Prize 21 The relators amount of the state is furth Prize 21 agroads Techniques. It will avert a 1.000 cash prize for an our standing contribution i the field of beam instru-	a Valanch reading the first and a first of the second seco	Caretin P. Wesce, Coordinator and ful information on from to apply can be found on the DITANET website: www.ibr.ac.uk/dtanet	DITANET directly contrib- tests some of the LPG installations such as the synchrotron light tile installation such as the installation expert it is synchrotron light tile the longiturial deam profile. For an in- strumentation expert it is number of the longiturial the longiturial	searchers from all over the world in its first bpial workship on low energy. The second second second second is goal of encouraging knowledge exchange be- ween pathress and driving new developments. 2010 promises to be an- other very exciting year for our community with many the BIW and IPAC in May. DTANET will cognize a number of training events page on a regular basis. Caster P, Wesch, Coordnater
		Individual Highlights Forthcoming Events 3 New to the Network 6 Policitations 8 Notice Board 8	The LHC pushes acce erator science and ted fields, including a number of beyond state-of-the-a developments in beam in strumentation. This in quiries close collaboration between partners, the ex- picitation of systemic wherever possible, and tong term R&D planning.		
			DITANET Prize 20 Applications are still oper for the Network's fin Price in Boson Diagnost A 1,000 euros cash priz is awarded for an ou standing contribution t	DO9: Applications s the field of beam instru- tomeration for particle ac- collectration for particle ac- in the first five years of the his/her professional ca- tereer. The deadline for applica-	till open sons is 31 <sup>st</sup> January 2010 and full information o how to apply or be folan on the DirANet wessile: www.liv.ac.uk/ditanet





# **Dissemination: DITANET Prize**

- Dr. Frank Becker, GSI, Germany
- Beam Induced Fluorescence Monitor
- International Competition, open to external candidates







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TUPSM020





- Projects now running at full speed;
- Developments through joint effort between research centers, universities and the private sector;
- Stimulation of research careers in beam diagnostics;
- Many events for whole community stay tuned !

Unique opportunity to push our field.

Many thanks to all partners & to BIW organizers !



