

DITANET

« novel Diagnostic Techniques for future particle Accelerators:
A Marie Curie Initial Training NETwork »

Carsten P. Welsch

- On behalf of the DITANET Consortium -

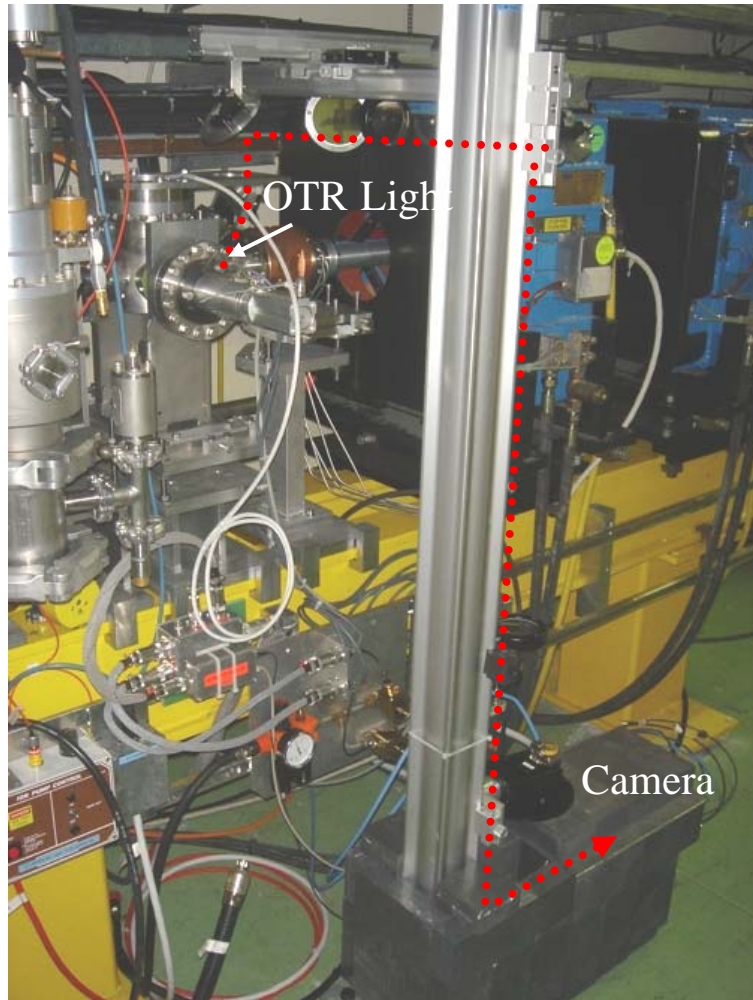


Outline

- What is DITANET ?
- Involvement of Industry
- Research
- Training
- What does it mean to you ?



A „typical“ Monitor



- Material sciences
 - Thermodynamics
 - Electro-Magnetism
 - Optics
 - Mechanics
 - Electronics
 - Nuclear Physics
 - ...
- ➔ Multi-disciplinary field !

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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 !
- Allows for inter-sectorial collaboration !
- Recognized importance of beam diagnostics at European level !

(in physics top 12, 2007 – under extreme competition)



The DITANET Consortium

Network Participants



Associated Partners



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Including Partners From Industry

Full Network Partner	Offer research training & Recruit eligible researchers	Level 1
Associated Partner	Provide research training, complementary skills courses , (communication, enterprise cycles, innovation, IPR, ...) secondments	Level 2
	Member of the Supervisory Board : definition of skills requirements for targeted researchers	Level 3

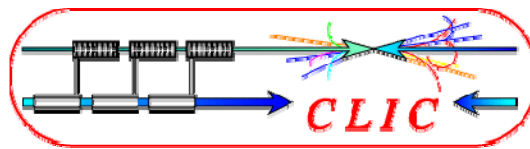
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Examples from the Research Program



XFEL

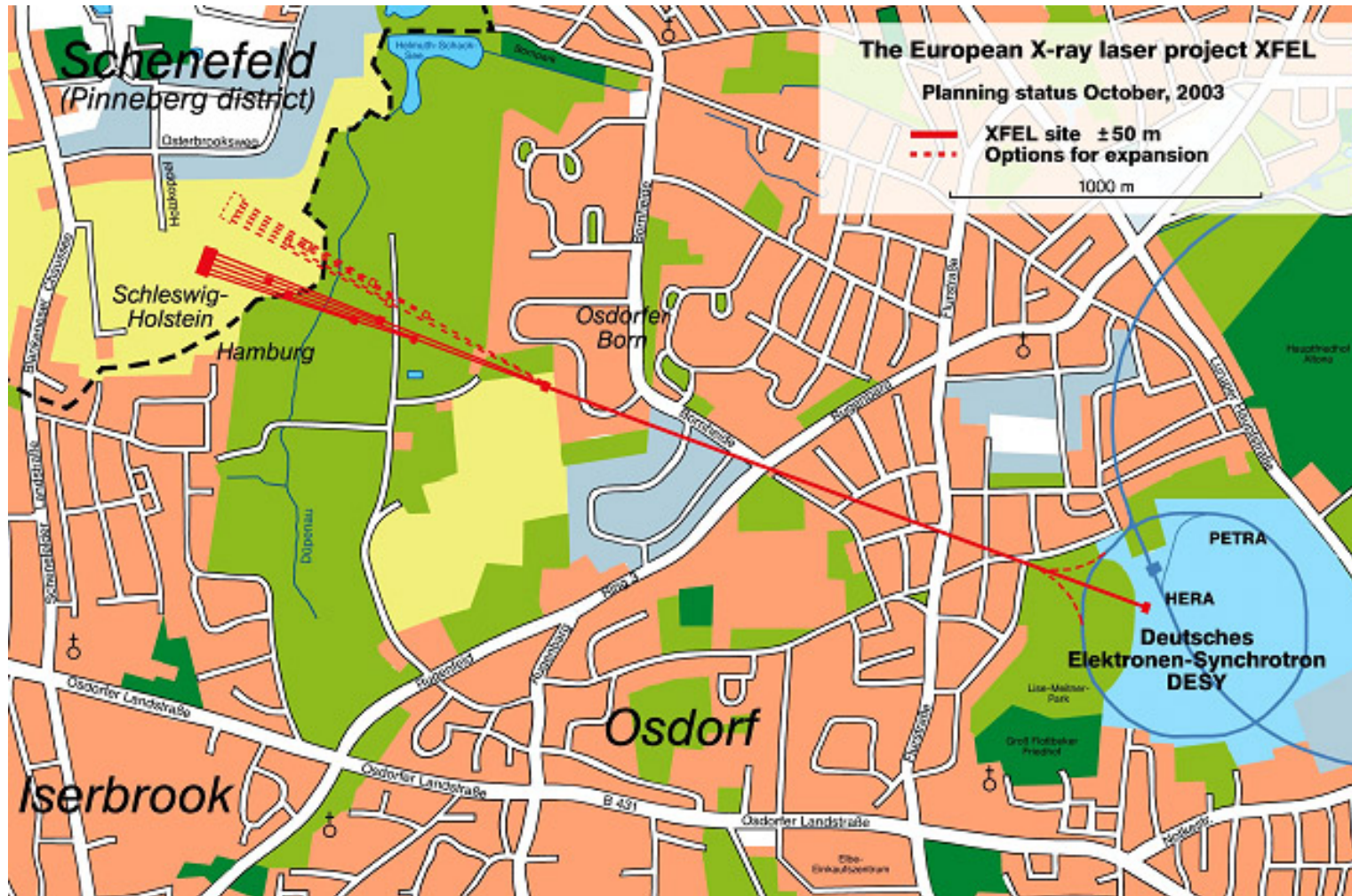


CTF3



USR @ F(L)AIR

The XFEL Project



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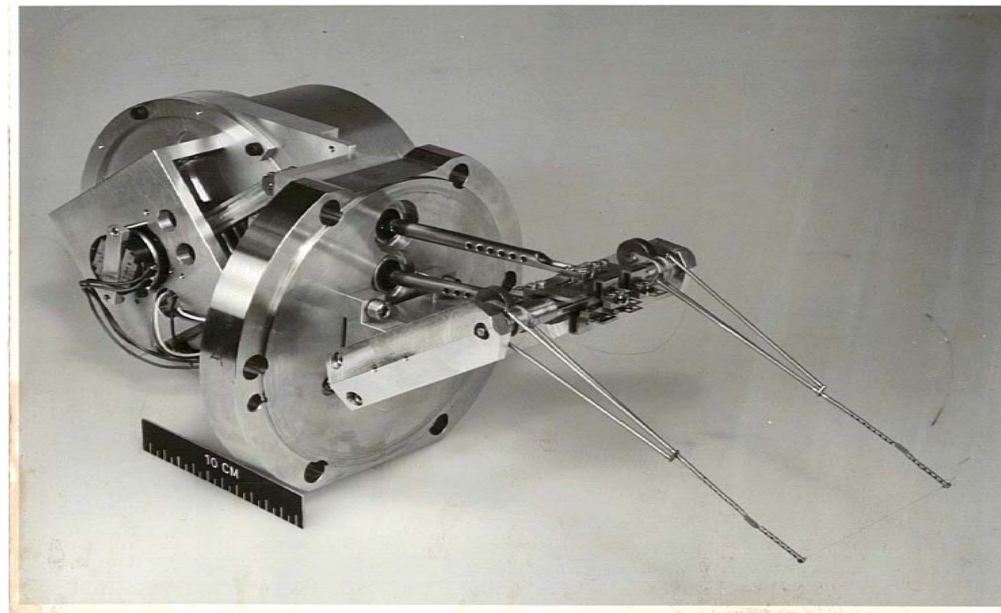


Wire Scanners

..established for measurements in accelerators.

Advantages:

- Resolution: 1 μm
- Reliable
- Direct



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Challenge: Heat Load on Wire @ X

$$-\frac{dE}{dx} = \frac{4\pi}{m_e c^2} \cdot \frac{nz^2}{\beta^2} \cdot \left(\frac{e^2}{4\pi\epsilon_0}\right)^2 \cdot \left[\ln \left(\frac{2m_e c^2 \beta^2}{I \cdot (1-\beta^2)} - \beta^2 \right) \right]$$

$$T = C \cdot \frac{dE}{dx} \cdot d' \cdot N \cdot \frac{l}{c_p \cdot G} \text{ [}^\circ\text{C]}$$

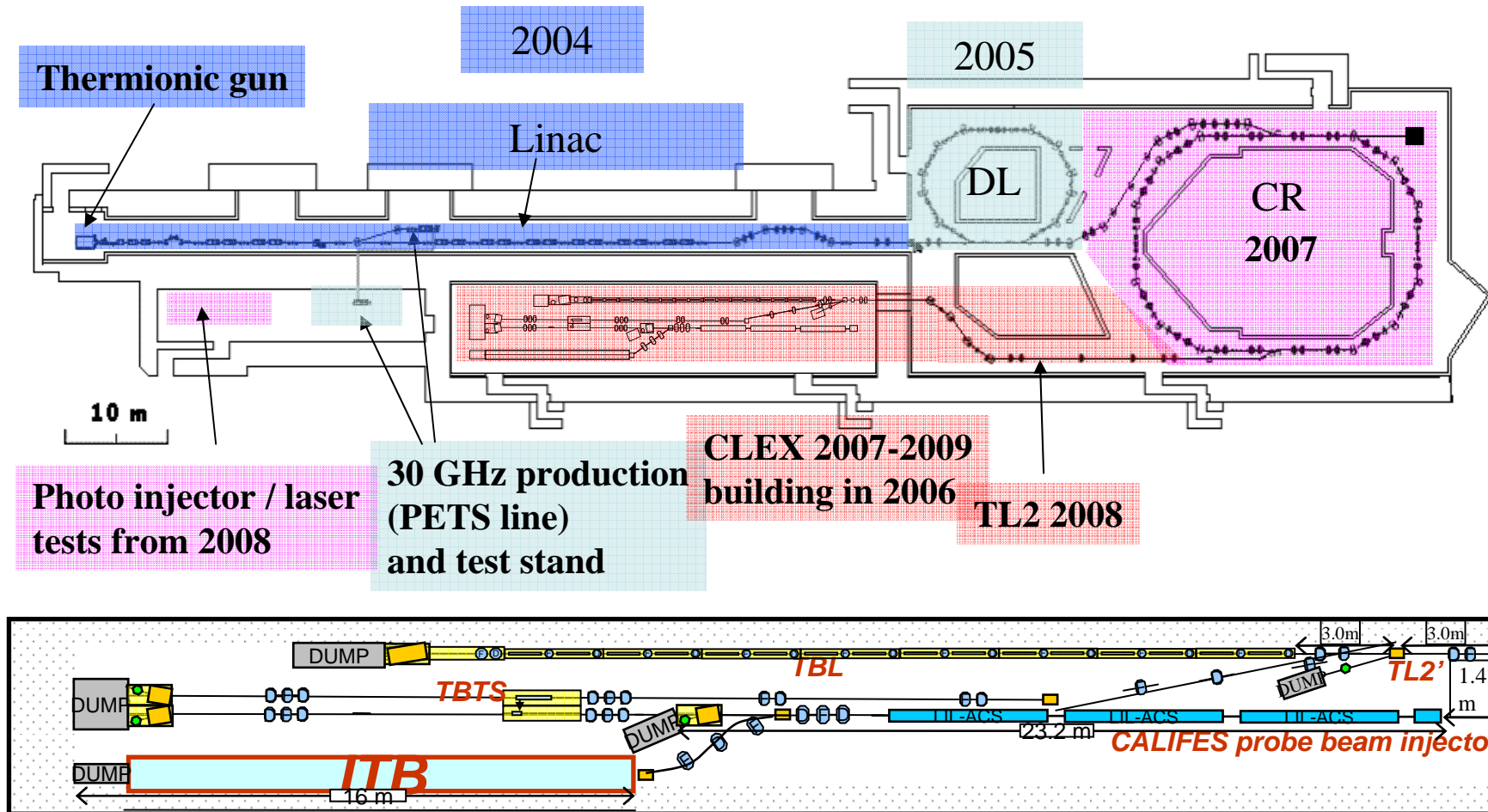
$T_{\max} \sim 2000^\circ\text{C}$

$$N = \frac{d' \cdot f_{\text{rev}}}{v} \cdot (NB \cdot n_{\text{Bunch}})$$



Required: Speed of 10-20 m/s with 1 μm resolution.

CTF3 - Overview



G. Blair, E. Bravin, T.Lefevre

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CTF3: An Ideal Testing Platform

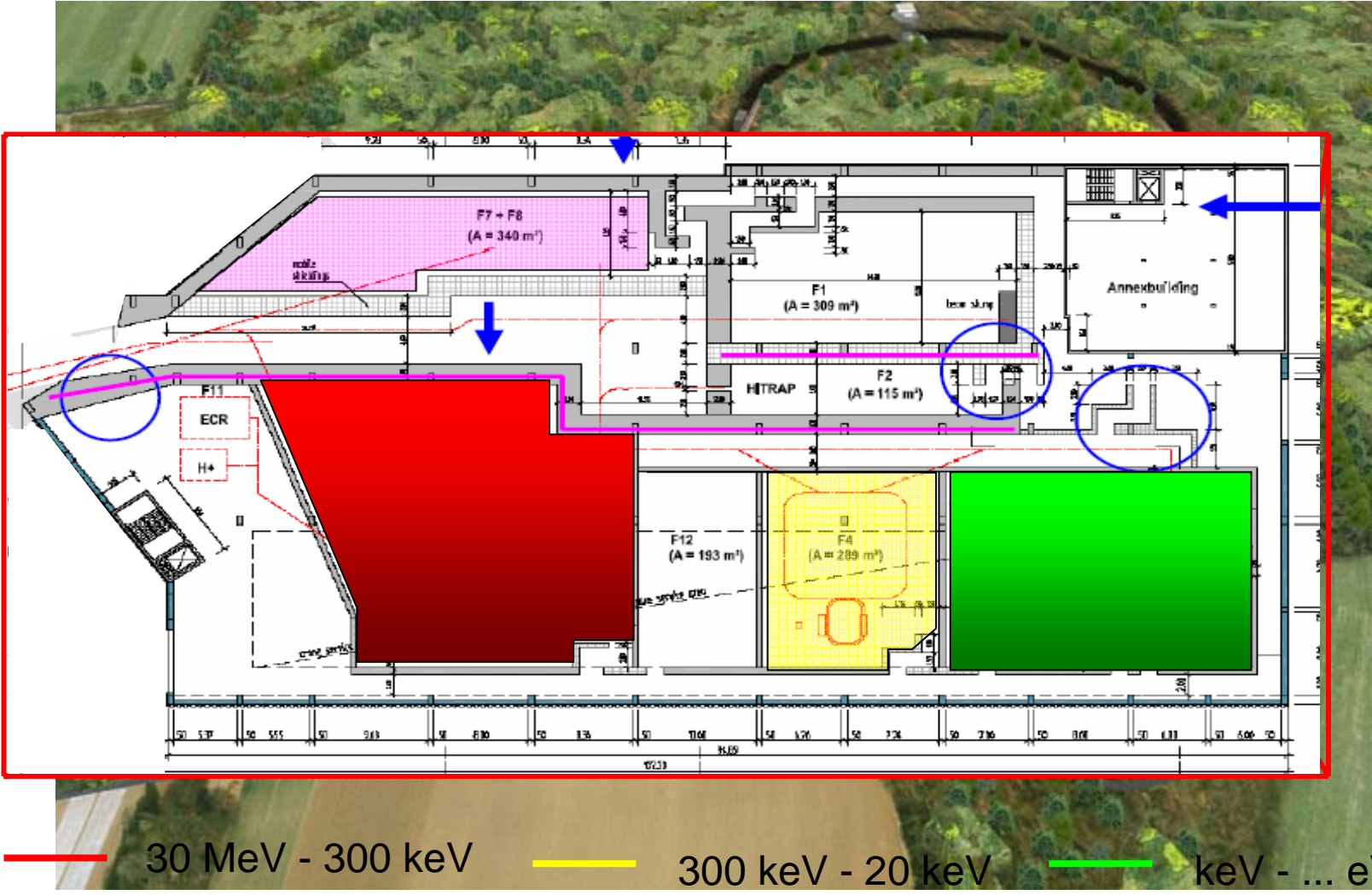


- Time-resolved spectroscopy
- Beam Halo Monitoring
- Simulation of CDR; compare to measurements
- Beam position monitors
- ITB instrumentation

G. Blair, E. Bravin, T.Lefevre



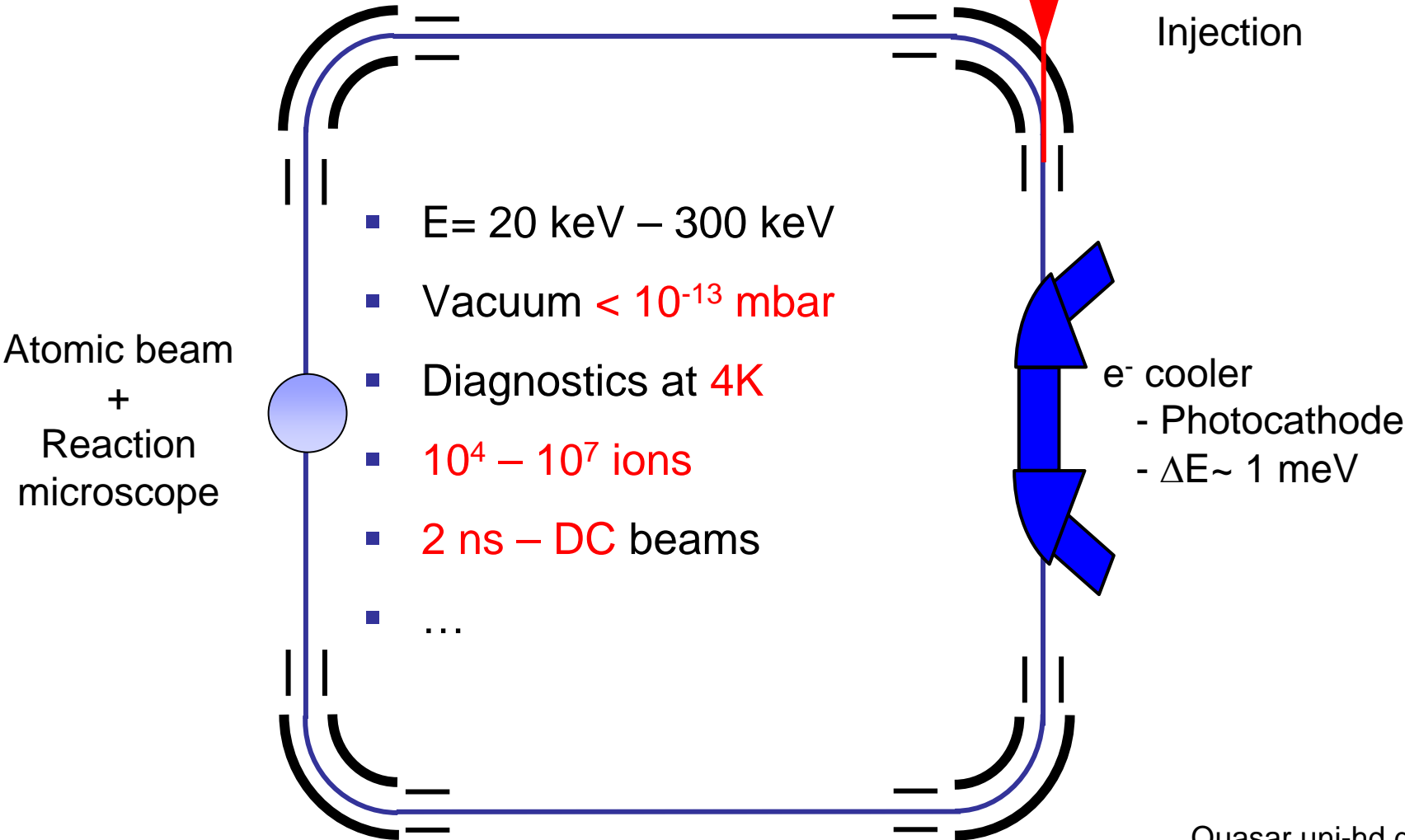
FLAIR @ Facility for Antiproton and Ion Research



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USR - Challenges



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Training

- Local training by host
- Network-wide schools on diagnostic techniques
- Inter-network exchange of researchers
- Secondments to partners from industry
- Training in complementary skills



Motivation: *Ideal* Training.

Outreach



- DITANET schools in 03/2009 (London) and 09/2010 (Stockholm)
- DITANET conferences in 2009 and 2011 (DIPAC ?!)
- Mini-Symposia, workshops throughout 4 years



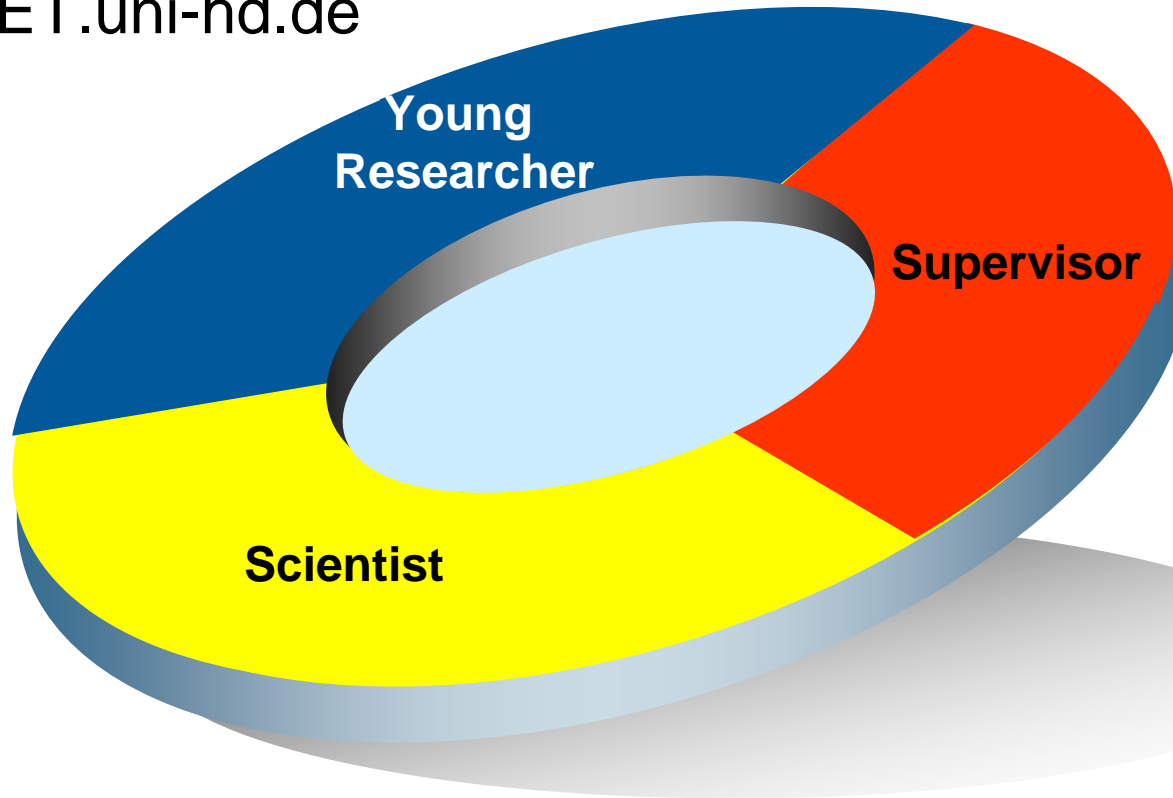
Open to external participants.



What DITANET means to you



DITANET.uni-hd.de



➔ Join in !

DITANET
Dipartimento di Fisica per le Alte Energie - Università di Padova

- University of Heidelberg, Germany
- CEA, Saclay, France
- CERN, Geneva, Switzerland
- DESY, Hamburg, Germany
- GSI, Darmstadt, Germany
- HET GmbH, Heidelberg, Germany
- HUN-EDU, Magsaric, Romania
- Royal Holloway
- University of London, UK
- Stockholm University, Sweden
- University of Seville, CSA, Spain

Open Positions at the Marie Curie Initial Training Network DITANET

Associated Partners

THALER
FAIR
VALLUX

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Conclusion



- Unique opportunity to push our field
- Developments through joint effort between research centers, Universities and the private sector;
- Innovative approach to training of young researchers;
- Many events interesting for whole community;
- Stimulation of research careers in beam diagnostics.

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