Academic Standing of Accelerator Research: EuCARD2 uniting communities

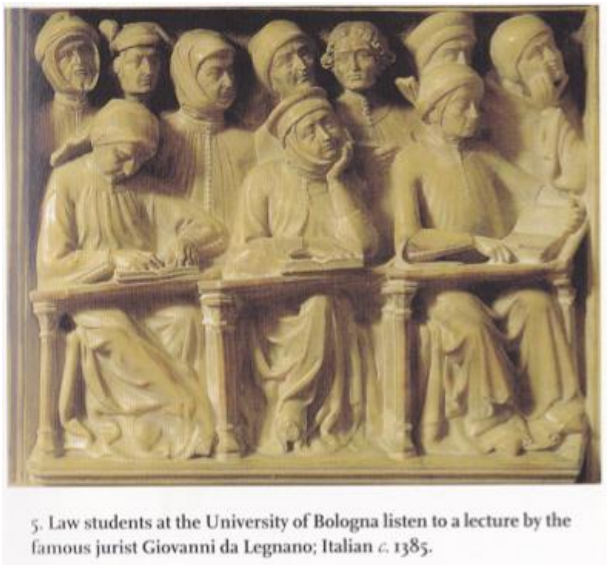
G. Franchetti, GSI

2nd EuCARD-2 Annual Meeting

21-24 April 2015

Hosted by the ALBA Synchrotron on the Campus of the Autonomous University of Barcelona, Spain

Universities

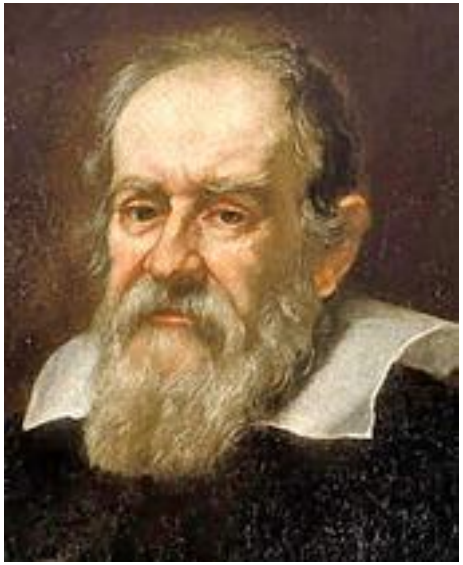


5. Law students at the University of Bologna listen to a lecture by the famous jurist Giovanni da Legnano; Italian *c.* 1385.

1) a place where a scholar traces the outlines of a discipline and within this framework carries a precise research for sake of knowledge
2) a place where a scholar, while carrying out his research, transmits his knowledge to a group of pupils who follow him freely, this being done outside any other official institution whether of the Church or the State
3) a place which society may, if necessary, turn to for research and exploitation of its knowledge

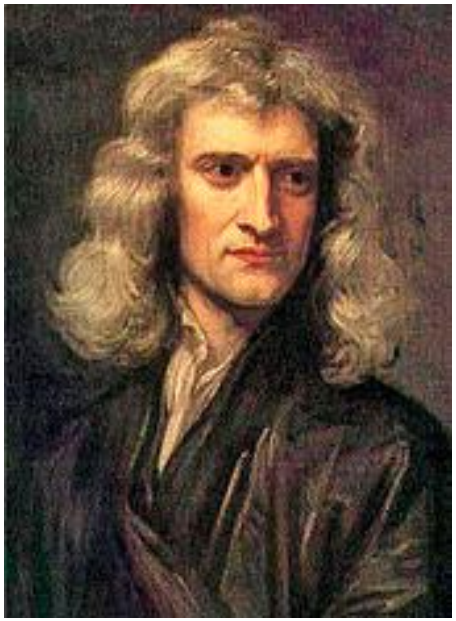
Physics in Universities

(in a modern sense)



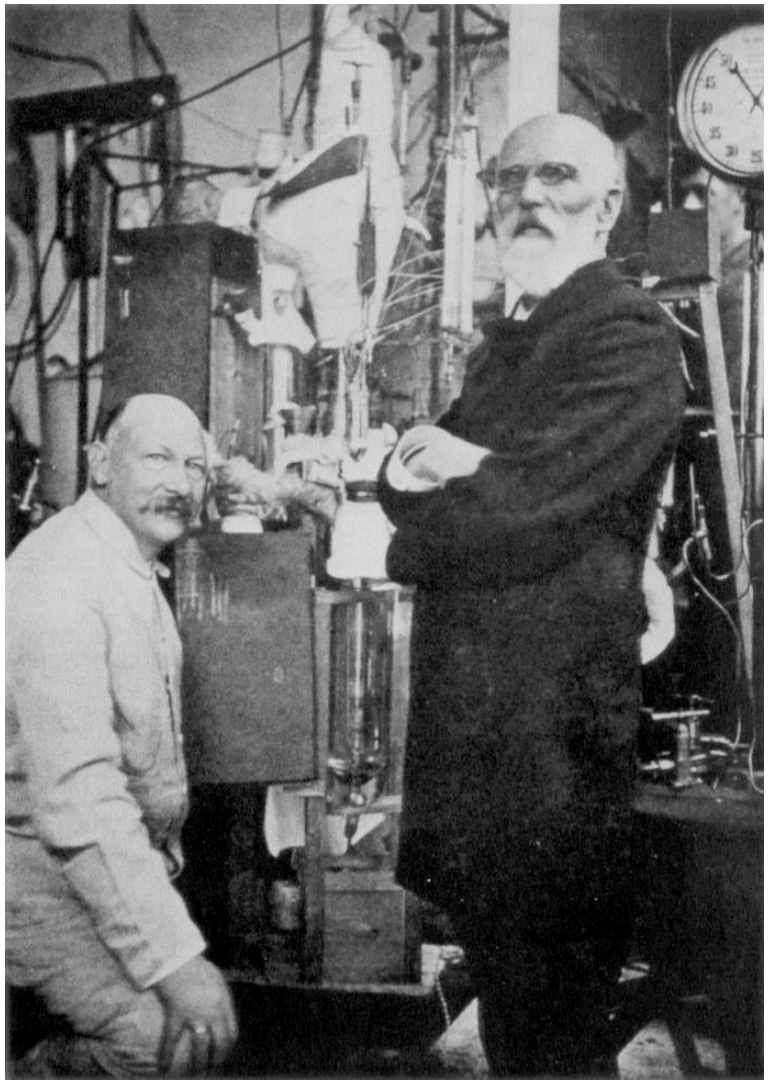
(1564–1642)

experimental method



(1642–1727)

Principia….

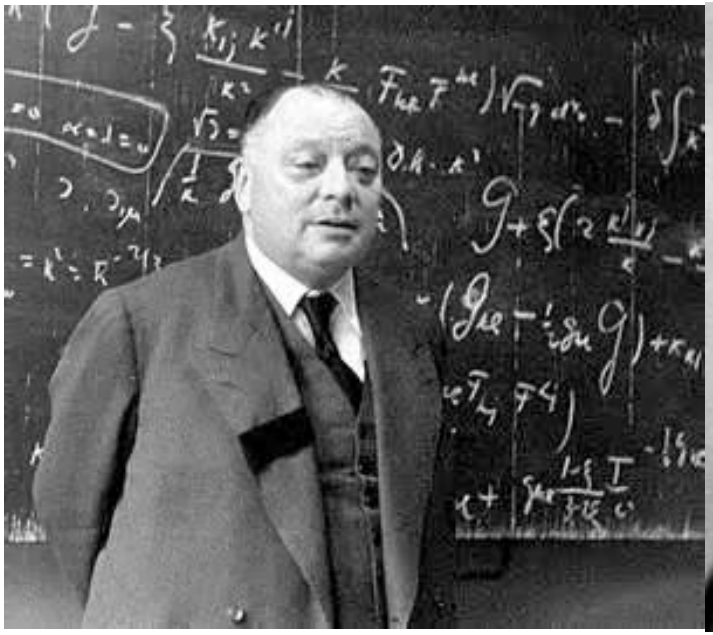


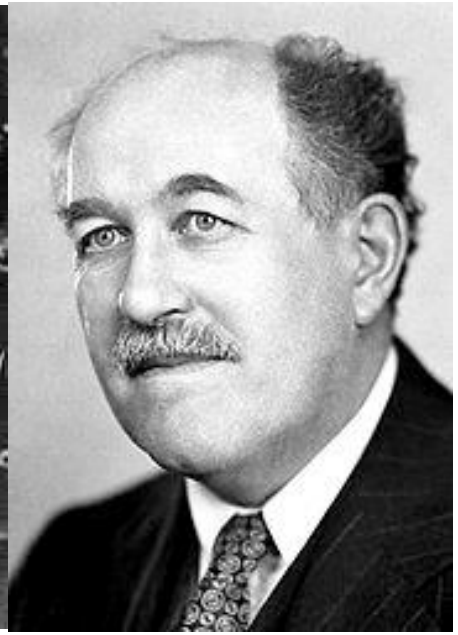
Onnes was a professor in the University of Leiden, but in 1904 he founded a cryogenic Laboratory: "Kamerlingh Onnes Laboratory"

Laboratories are born from Universities

Distinction of Universities and Laboratories is like a distinction between experimentalists and theorists

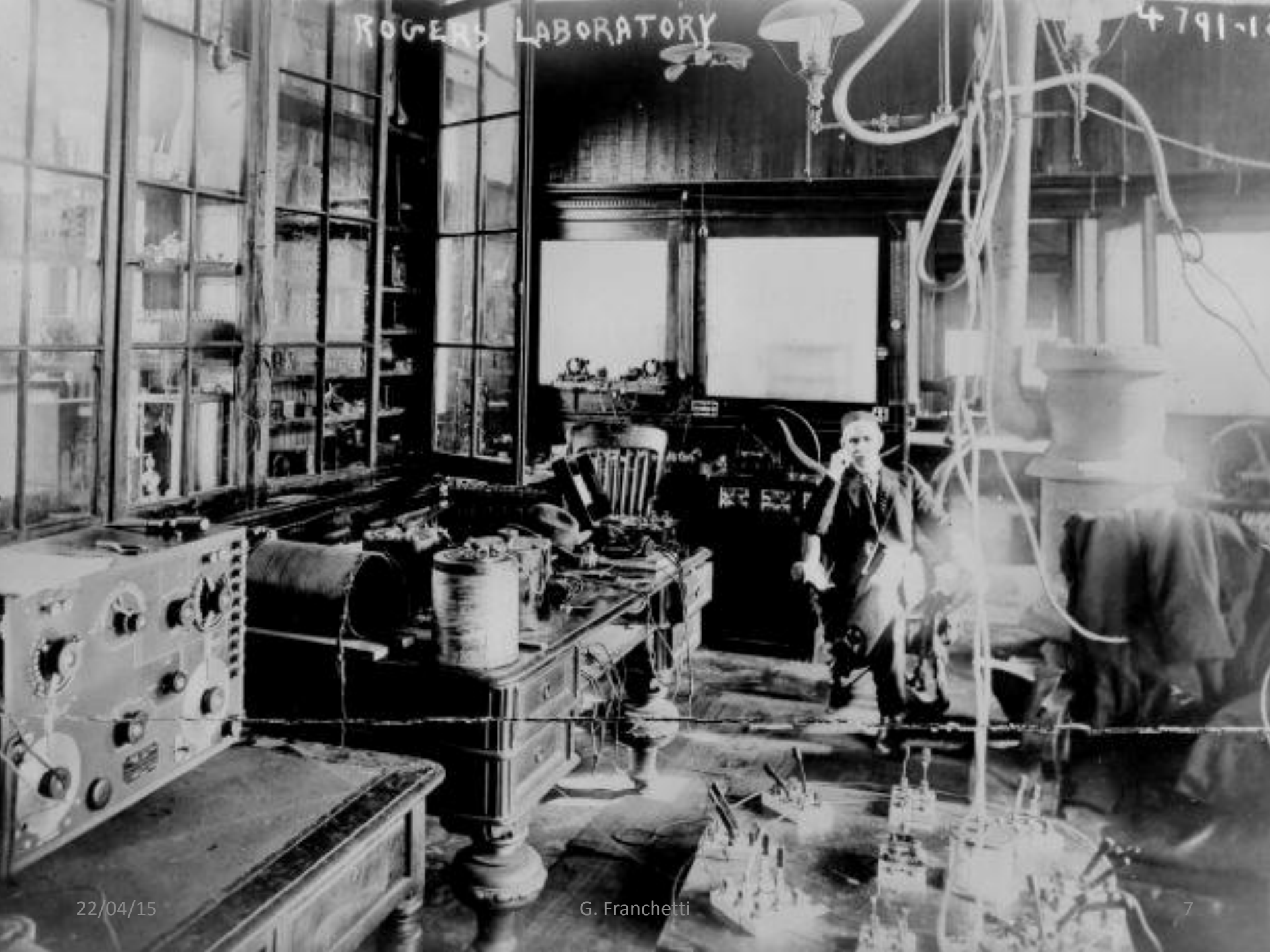
Early signals of differences: the Pauli effect





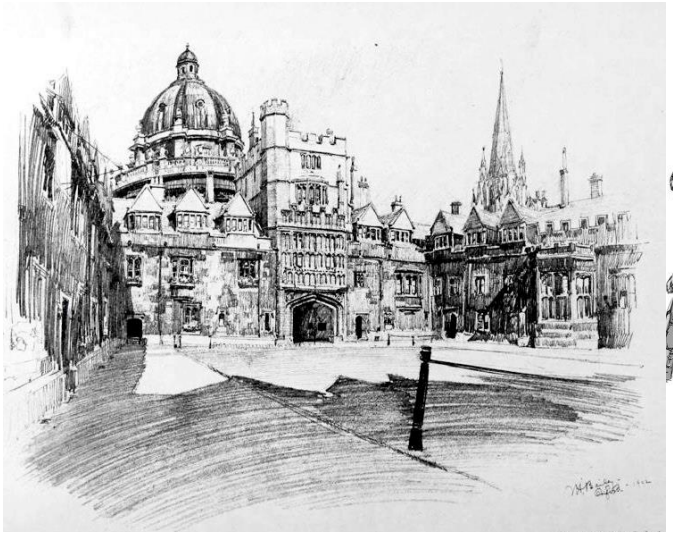
it was said that he was such a good theorist that any experiments would **self-destruct** simply because he was in the vicinity.

For fear of the Pauli effect, the experimental physicist Otto Stern banned Pauli from his laboratory in Hamburg despite their friendship.

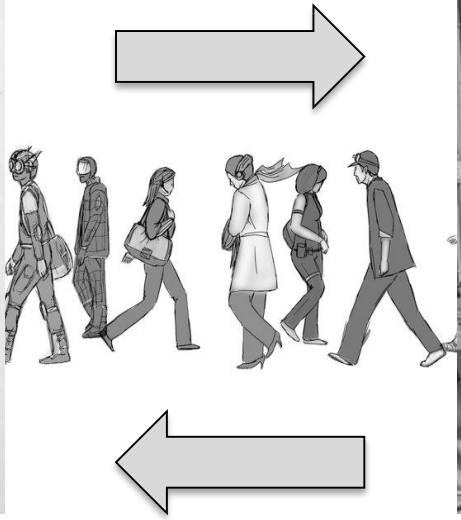

ROGERS LABORATORY

Two worlds… different rules

Universities



Millenary tradition



?

Laboratories

Born since a century
as a “spin-off”

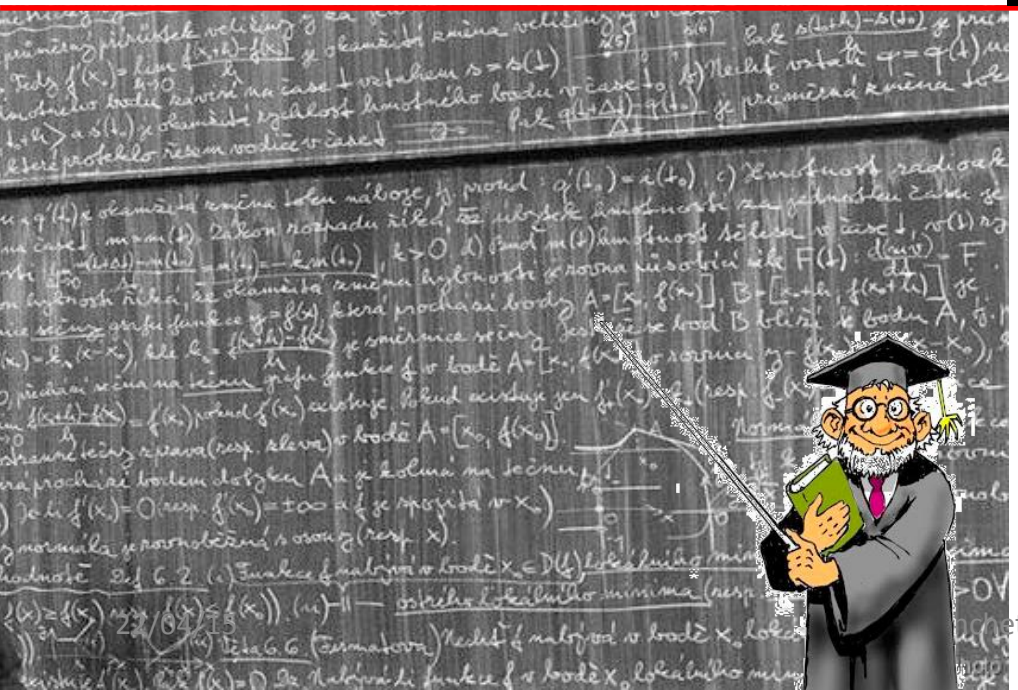
Universities

Two world, two views: Seen from Universities

Laboratories

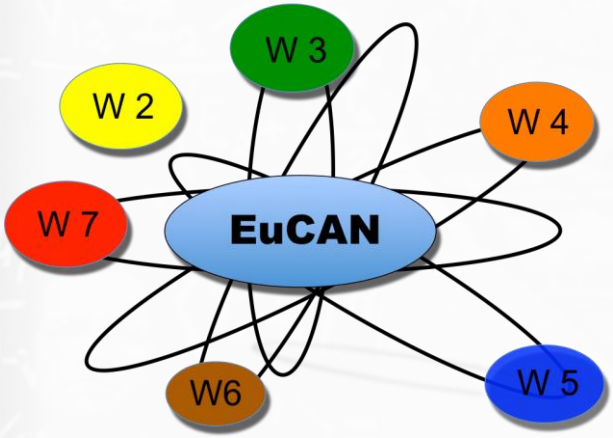
Two world, two views: Seen from Laboratories

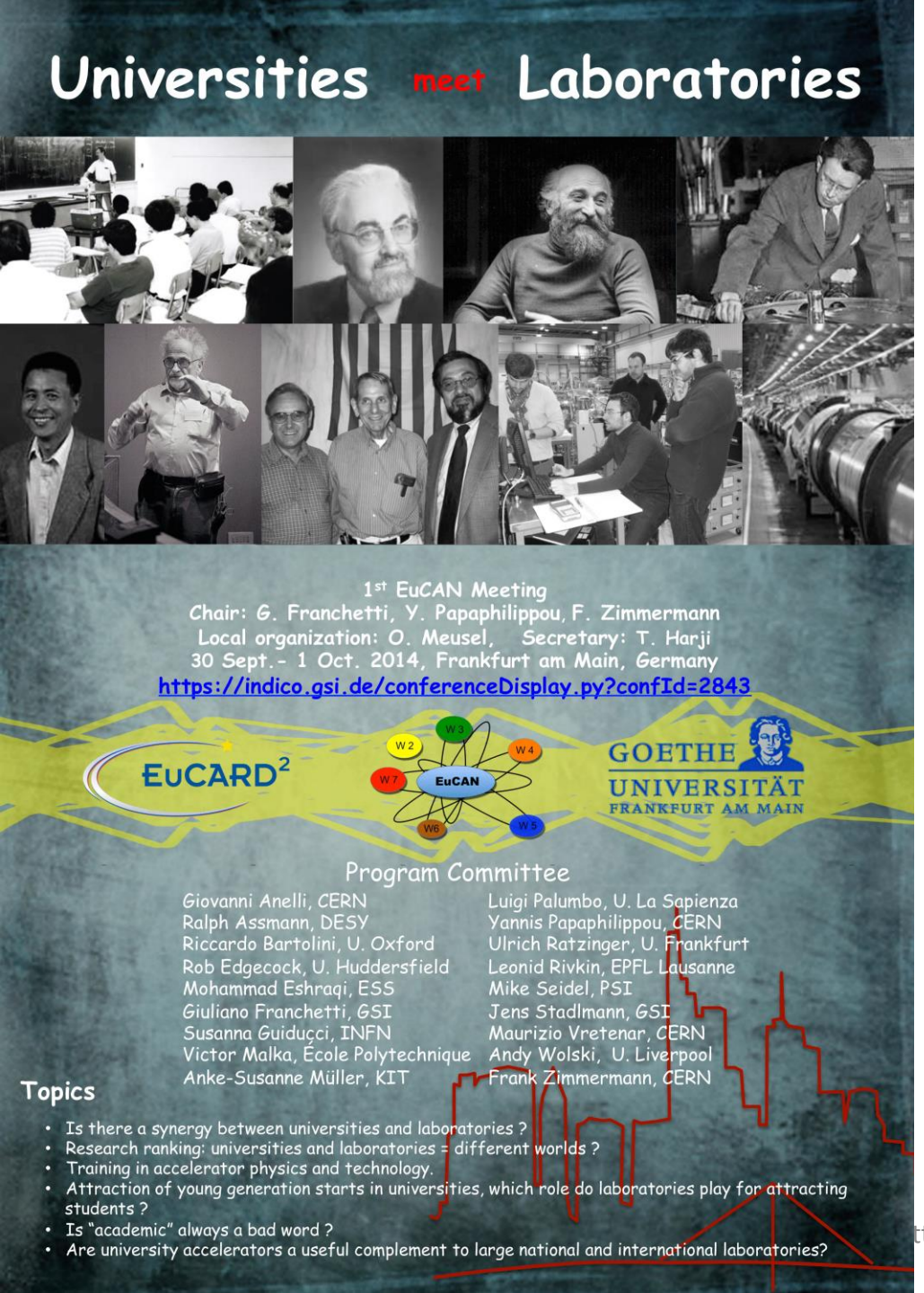
I am cool



this is academic

EuCARD²



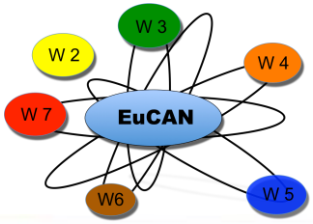


Thanks to

Organization: Oliver Meusel
Secretariat: Tanja Harji

Prof. Holger Podlech (IAP director)

EuCARD²



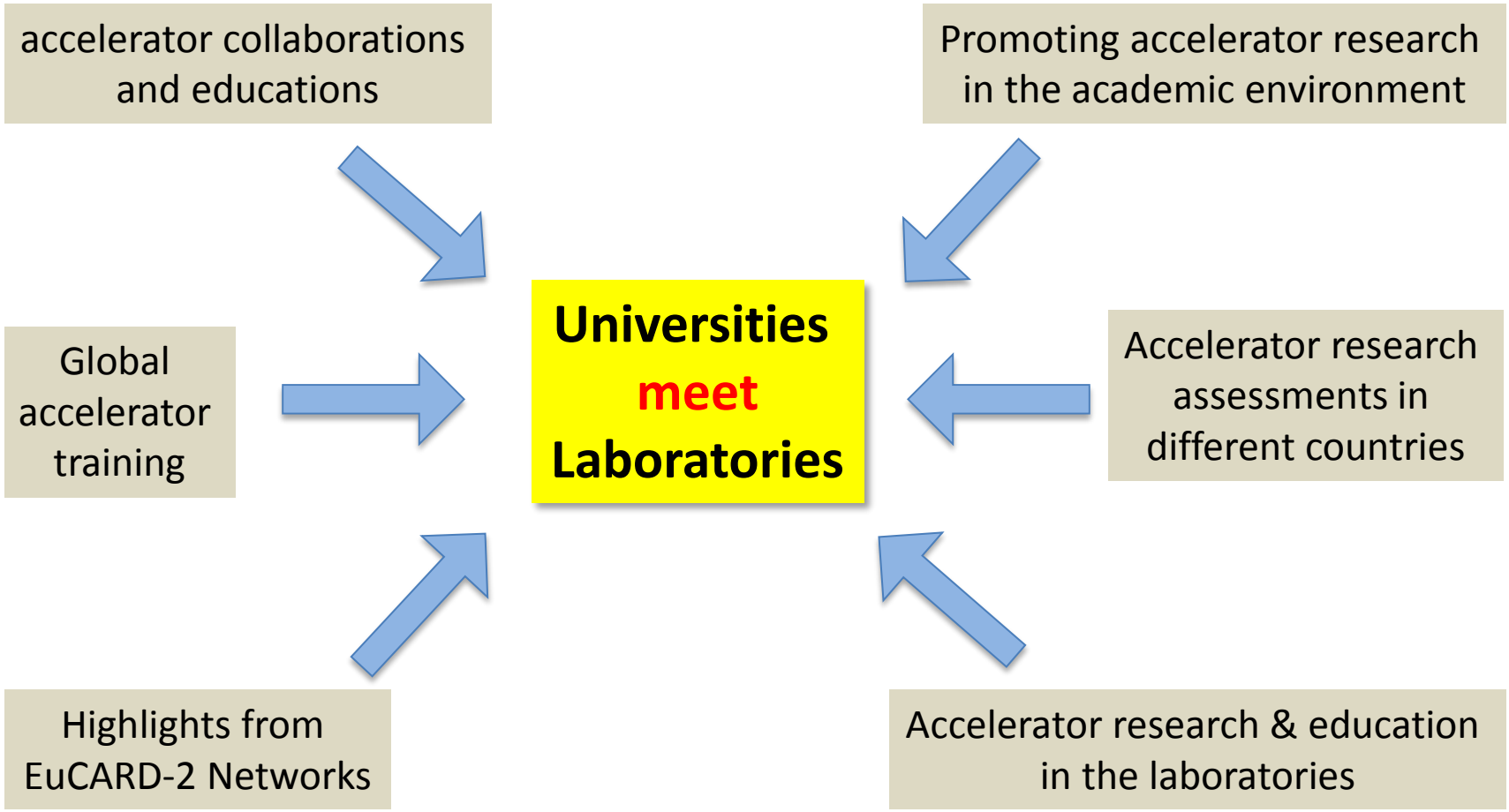
GOETHE UNIVERSITÄT FRANKFURT AM MAIN

Participants

France: 3 (CNRS/IN2P3/LAL, CEA, CERN);
Germany: 15 (DESY, GSI, TUD, Goethe University, Helmholtzinstitut Mainz);
Italy: 2 (University of Rome, INFN-LNF);
Japan: 1 (KEK);
Slovakia: 1 (Slovak University of Technology in Bratislava);
Spain: 1 (Istituto de Fisica Corpuscular Valencia);
Sweden: 1 (Uppsala University);
Switzerland: 9 (CERN, PSI, EPF Lausanne);
UK: 5 (University of Manchester/Cockcroft Institute,
STFC Rutherford Appleton Laboratory, University of Oxford);
USA: 1 (MIT/USPAS).

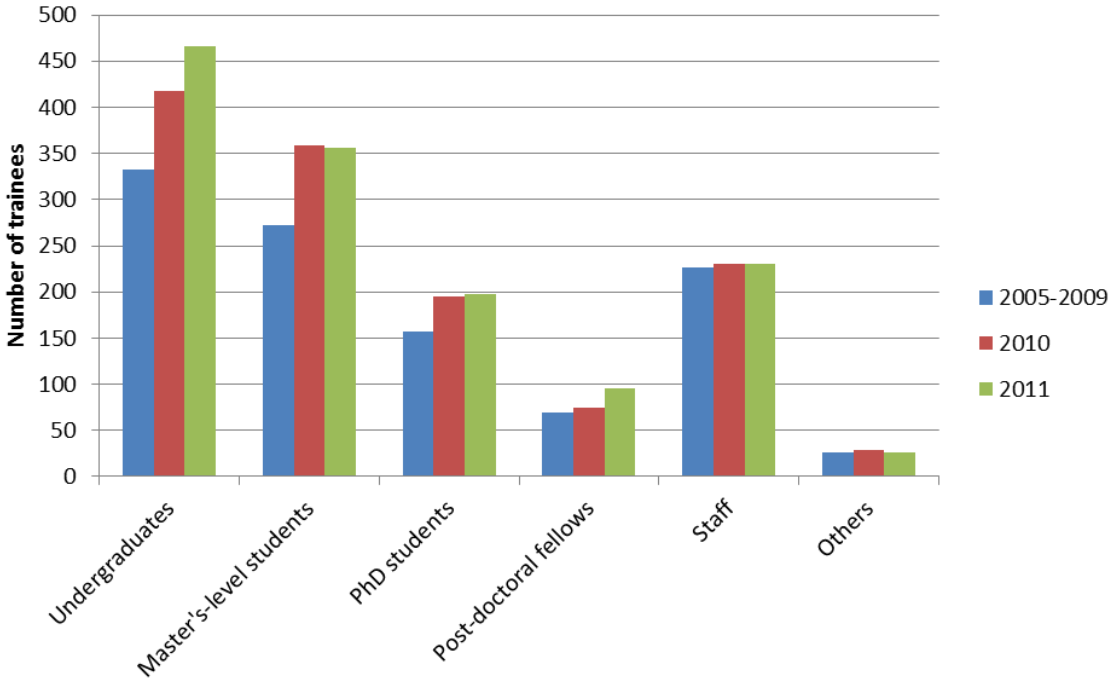
22/04/15

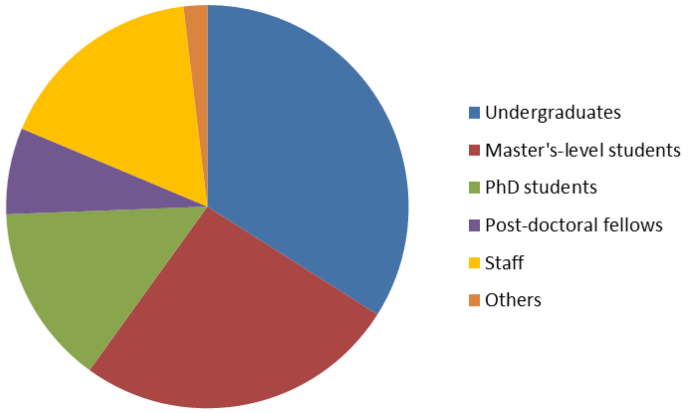
Landscape


accelerator collaborations and educations
Promoting accelerator research in the academic environment
Global accelerator training
Universities meet Laboratories
Accelerator research assessments in different countries
Highlights from EuCARD-2 Networks
Accelerator research & education in the laboratories

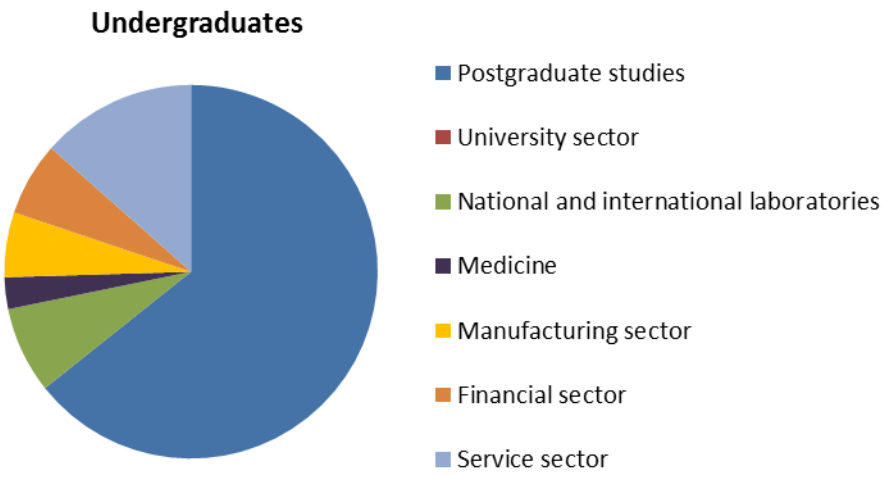
Accelerator collaborations and educations

TIARA, Philip Burrows

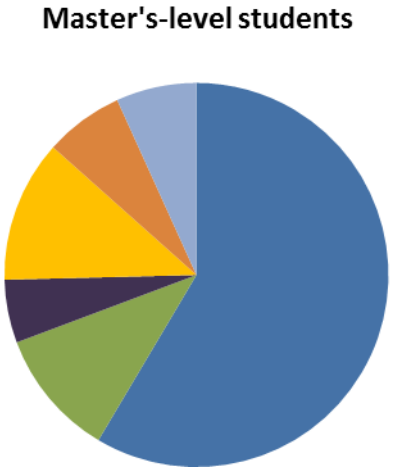


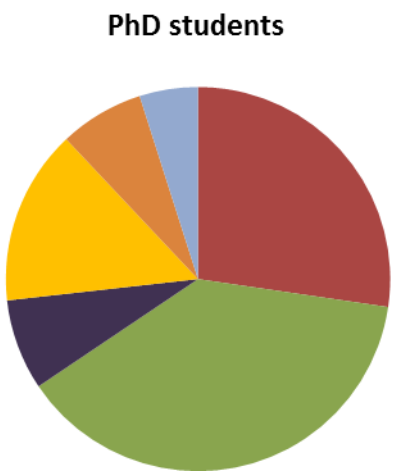


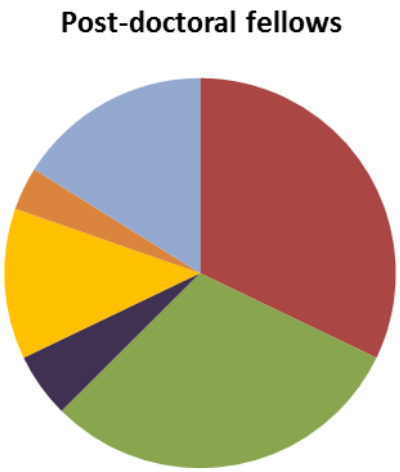
Career destinations



TIARA, Philip Burrows







EU co-founded R&D projects

R. Aleksan

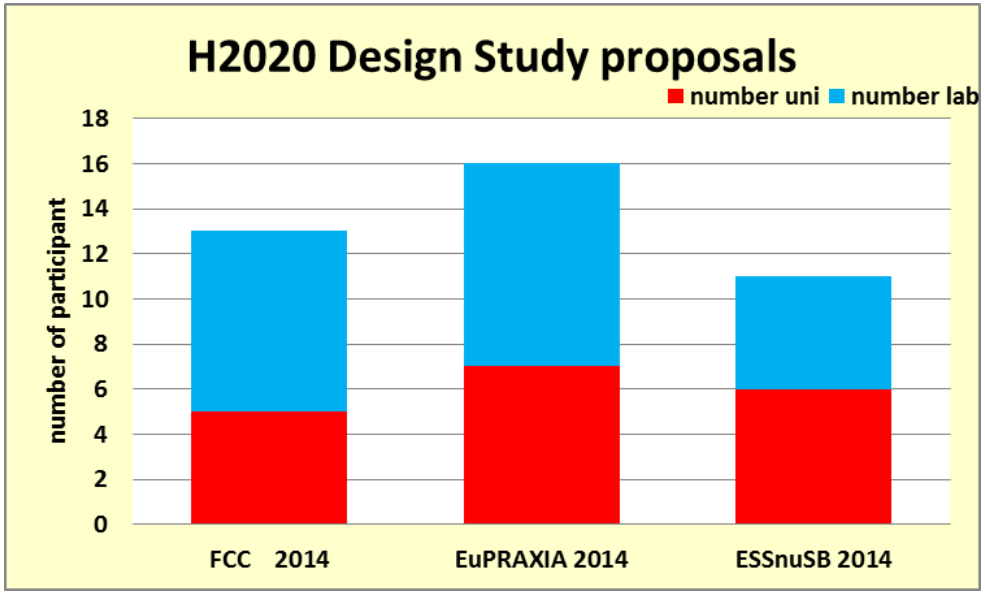
ESGARD mandate:
develop and implement a Strategy to optimize and enhance the outcome of the Research and Technical Development in the field of accelerator physics in Europe

participants FP6-7

60% are universities

For fostering the community to carry out Accelerator R&D in a collaborative manner

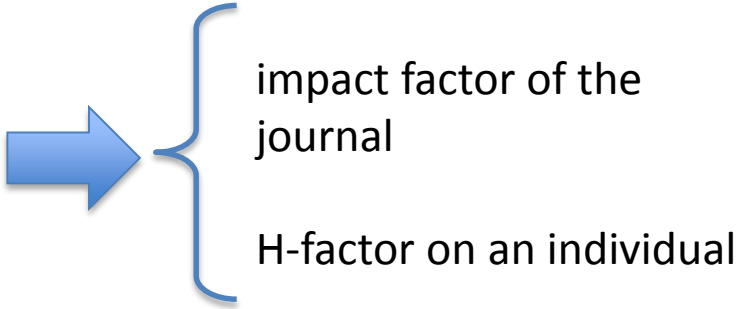
For enabling smaller institutes/universities to gain knowledge and experience by collaborating with large institutes and to access world class infrastructures



Promoting accelerator research in the academic environment

Although the Universities and Laboratories participate equally in EUSGARD promoted accelerator R&D activities, is it accelerator R&D of academic standing ?

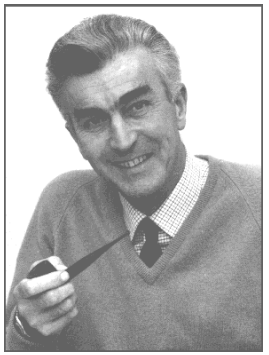
Research in academic environment
is documented in **publication** in journals



F. Zimmermann

different approaches to publishing

attitude at some laboratories:



"… if you have time to write papers you do not have enough real work to do…"

"We publish in concrete and steel!", John B. Adams

situation at universities (UK, Italy, Germany, US,…):

journal publications, impact factor or Hirsch index important for promotion and advancement in comparison with other physicists & scientists

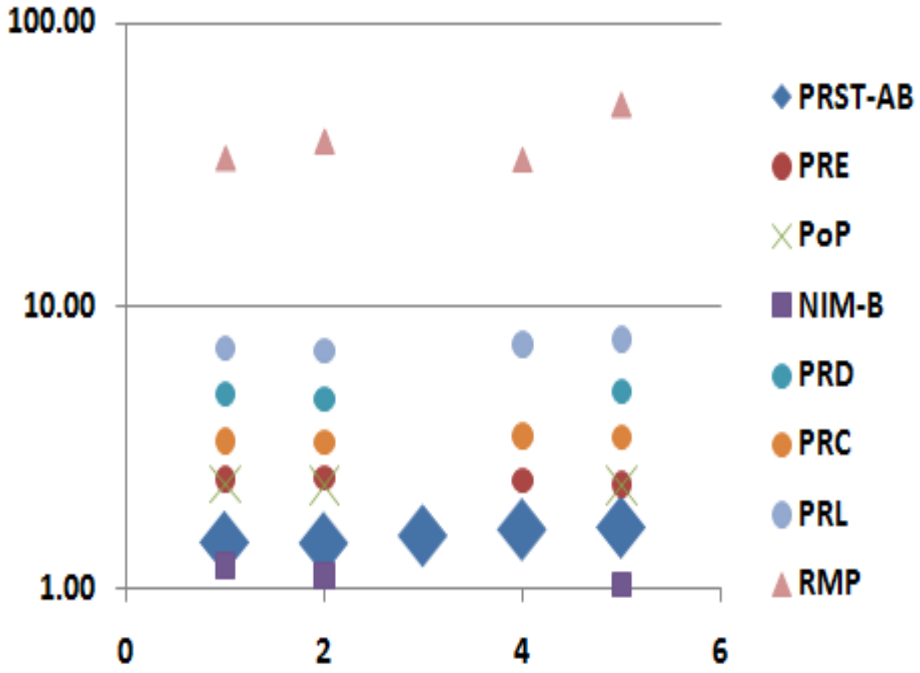
often significant portion of evaluation process

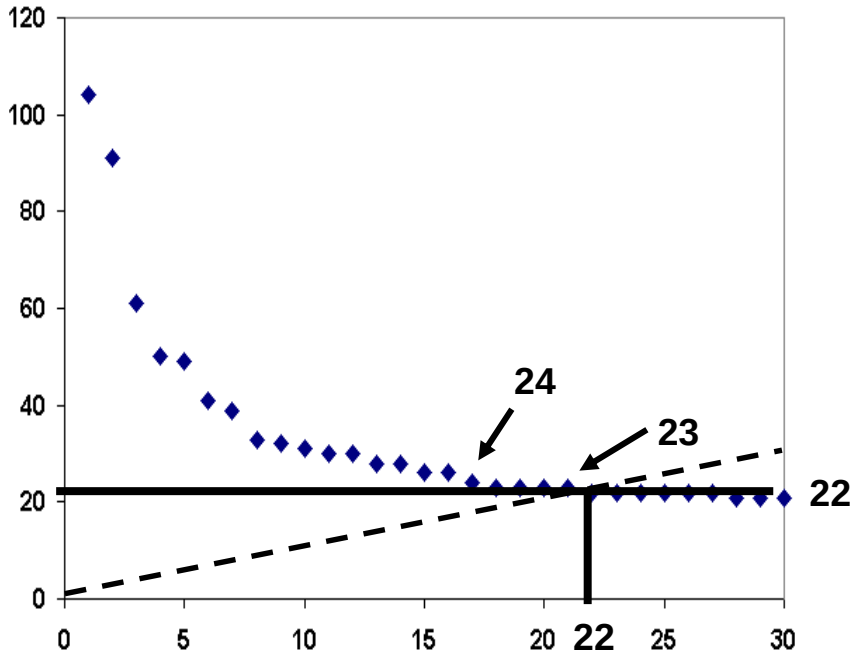
F. Zimmermann

Hirsch suggestions for what *h*-index implies for individual physicists

- *h* ~ 10-12 might be a useful guideline for tenure decisions at major research university,
- *h* ~ 18 could mean a full professorship,
- *h* = 15–20 could mean a fellowship in the American Physical Society, and
- *h* > 45 could mean membership in the United States National Academy of Sciences.

IF – H-factor of PRSTAB





Therefore, at only 10 years old PRST-AB was already a full professor and an APS Fellow!

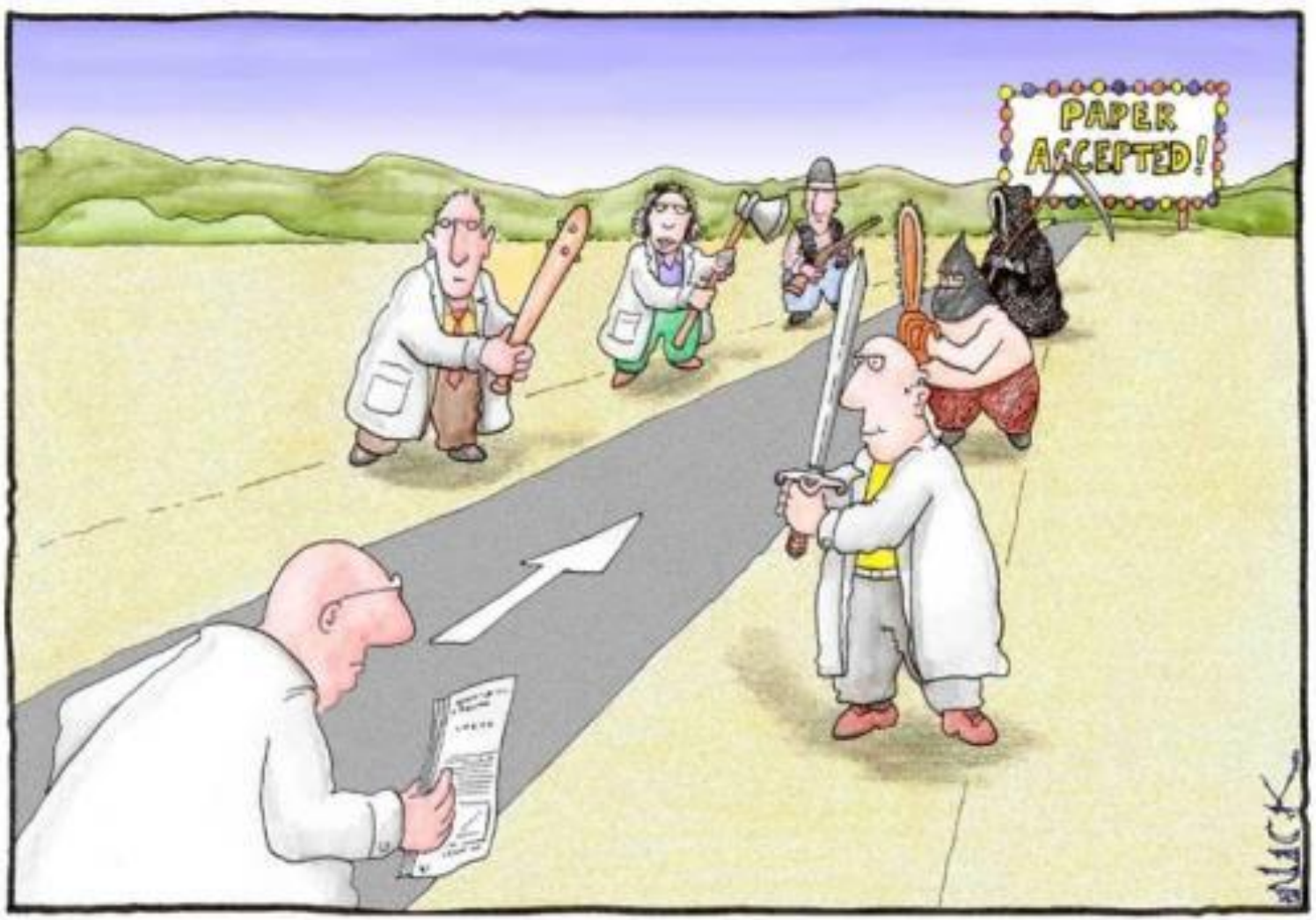
Who publish ?

in PRSTAB, the last 60 publications (@14/4/2015)

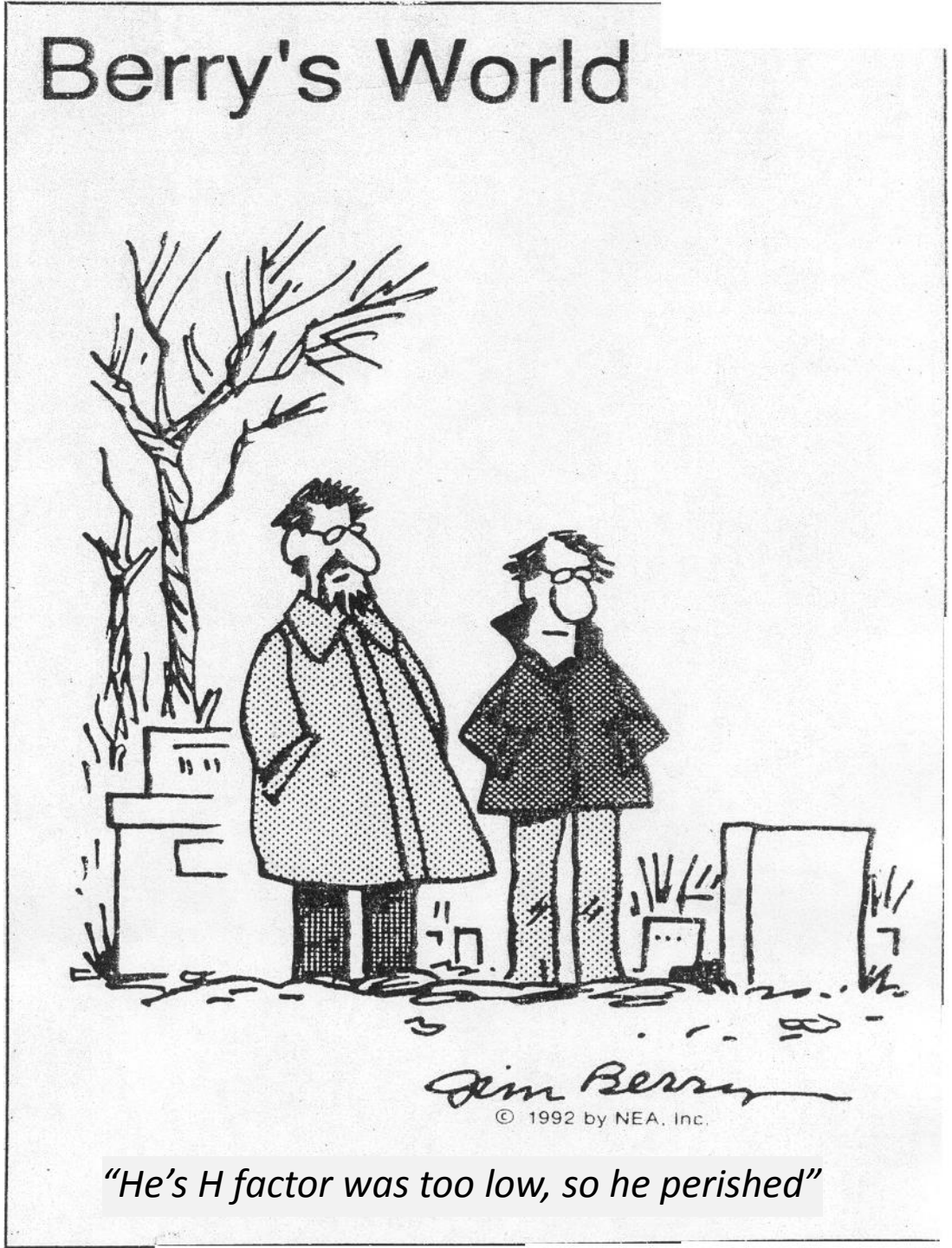
Laboratories	Universities	Laboratories + Universities
40%	6%	54%

Universities alone seem not to have an accelerator research or R&D that is published

Laboratories alone have a record of publications



The way to publication..



"He's H factor was too low, so he perished"

Accelerator research assessments in different countries (attempt of summary)

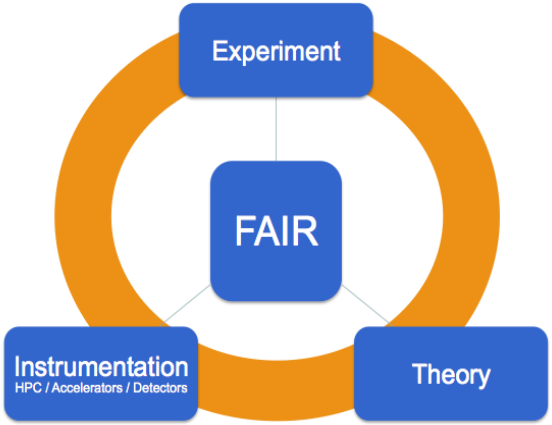
	Accelerators community L	Joint appointments	Accelerator community U	L research recognized in U	U with L	U & L synergy	issues for U	students /year
IT	240		10	no (proceedings not recognized)				
DE		yes		no (bad publications habits)	5		difficult to attract good students	
CH						works well		
UK			60 PhD in UK	check: grant income, h-index, and invited talks		works well		
ES				5 publications of high IF Journal. proc. no good.				
FR			recruitment 1/year				difficult to attract good students	
SE	25-35 PhD in ESS							3
JP			9/100 students in acc. science					
SK	3 labs				2		accelerator phys. avoided	

Accelerator research & education in the laboratories

J. Stroth

HIC for FAIR

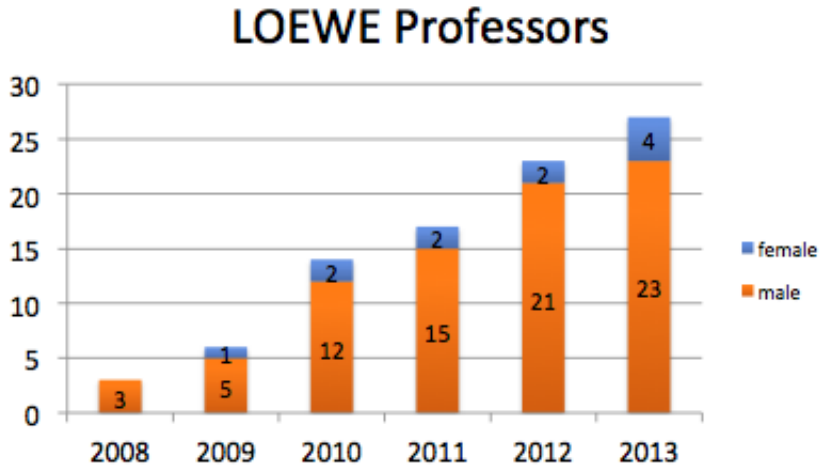
430M€ between 2008-2013



Partners of HIC for FAIR

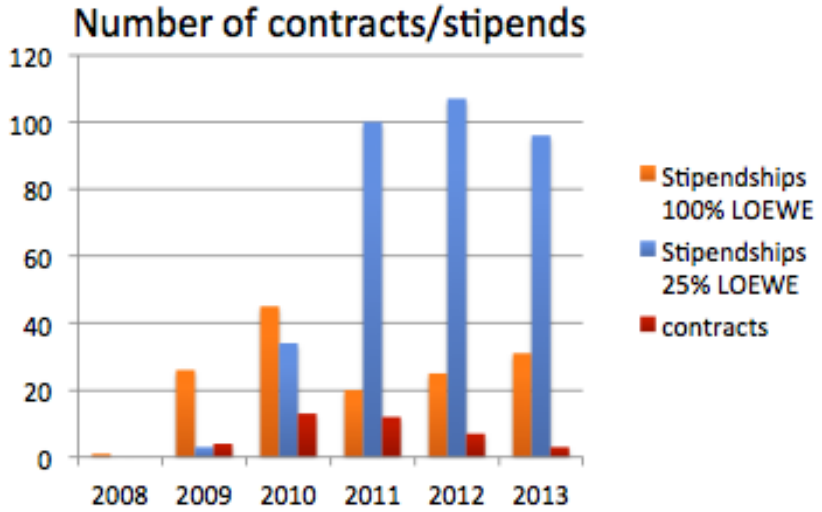
- JLU Gießen
  - I. Physikalisches Institut
  - II. Physikalisches Institut
  - Institut für Theoretische Physik
  - Institut für Angewandte Physik
- GU Frankfurt
  - Institut für Angewandte Physik
  - Institut für Kernphysik
  - Institut für Theoretische Physik
  - Institut für Mathematik und Informatik
- Frankfurt Inst. for Adv. Studies (FIAS)
- TU Darmstadt
  - Institut für Kernphysik
  - Institut für Theorie Elektromagnetischer Felder
  - Institut für Festkörperphysik
  - Institut für Materialwissenschaften
  - Fachbereich Biologie
- GSI/FAIR/Helmholtz Gemeinschaft

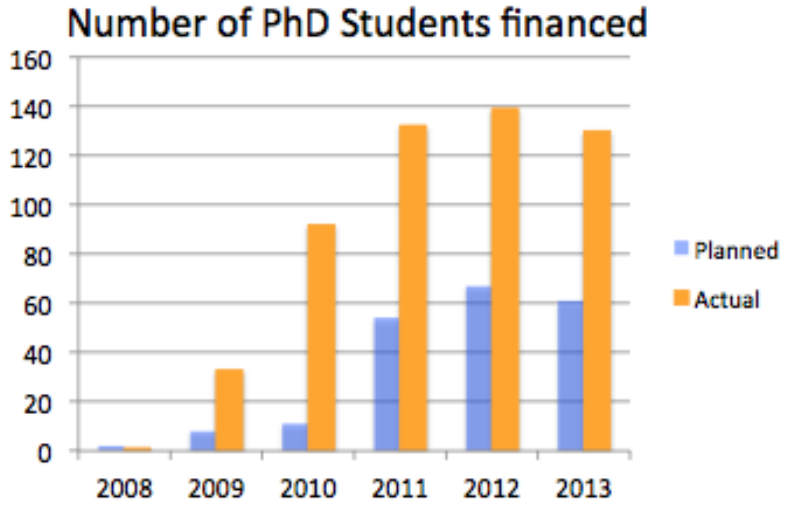
J. Stroth



3 professors in accelerator physics and technology (~11%) with joint appointment

Structured PhD Education





Global accelerator training

The CERN Accelerator School

juas
Joint Universities Accelerator School

MARIE CURIE ACTIONS

OPAC

started on 1st December 2011
with a duration of 48 months

Optimization of the performance of any **P**article **AC**celerators

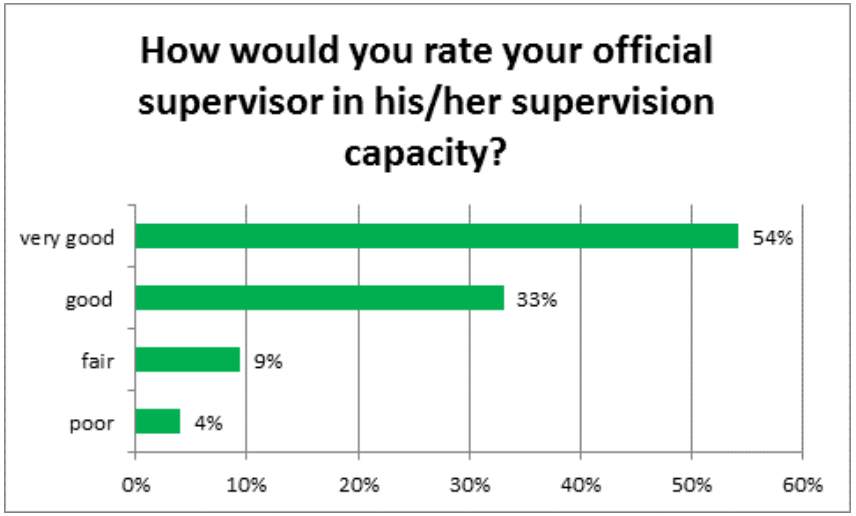
CERN-Universities: PhD co-supervision

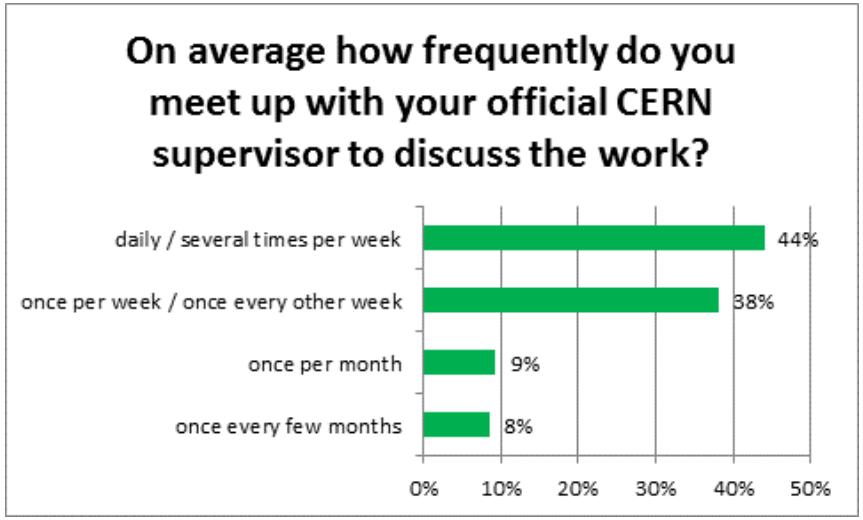
Stephan Russenschuck

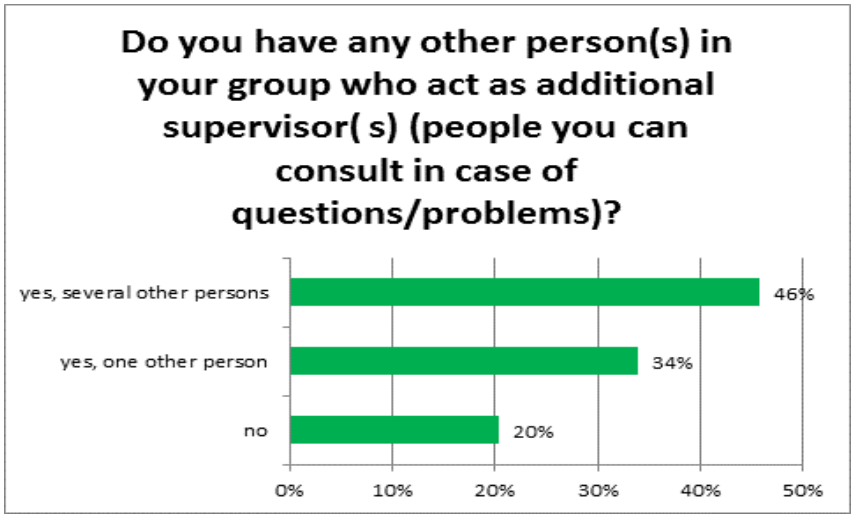
STAFF ~ 2200	Recruited from CERN Member States, limited duration, fixed term, or indefinite contracts
Fellows ~ 500	Young (< 32) graduates in physics and engineering, two years initial contract, for max three years
Students ~ 600	Students inscribed at home university, working at CERN for an internship, diploma, or PhD thesis
Associates ~ 220	Scientific and corresponding Associates: senior scientists on leave of absence Project associates: Physicists, engineers and technicians sent by their home institutes for periods of up to 3 years
USERs ~ 11.000	Sent by their universities to use the CERN facilities More than 80 nationalities und from more than 600 institutes

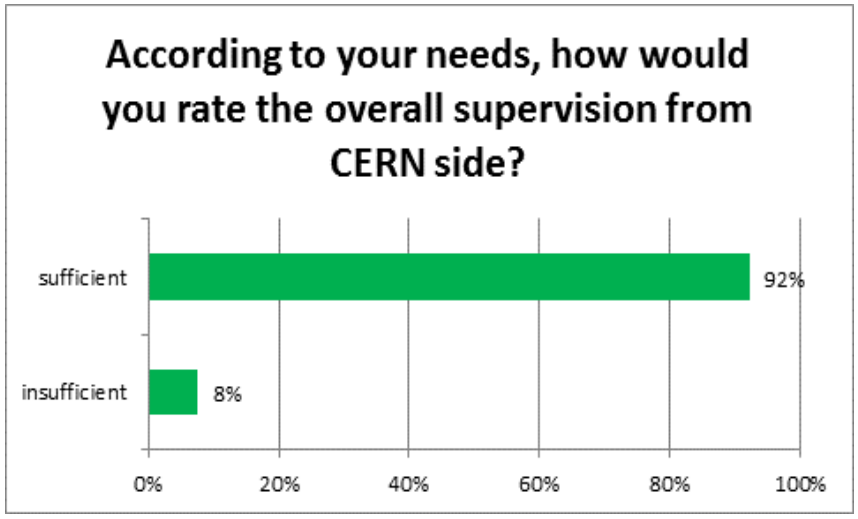
Questionnaire

Stephan Russenschuck



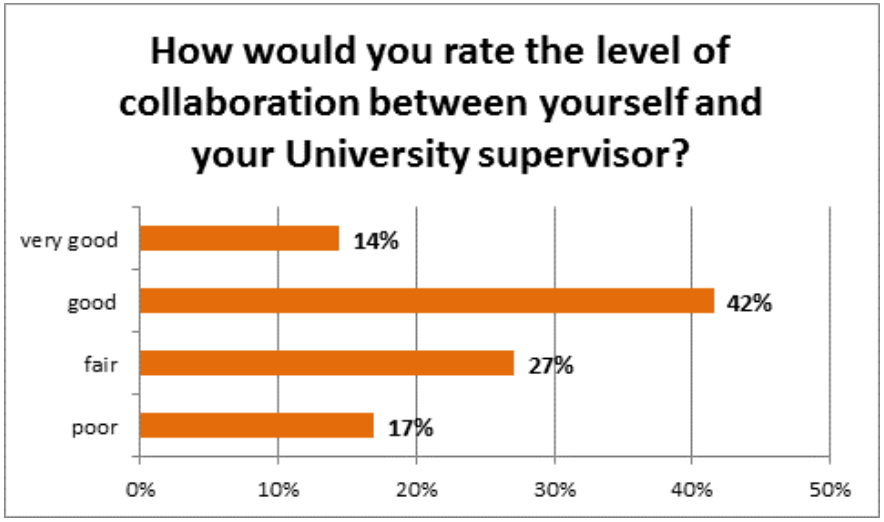


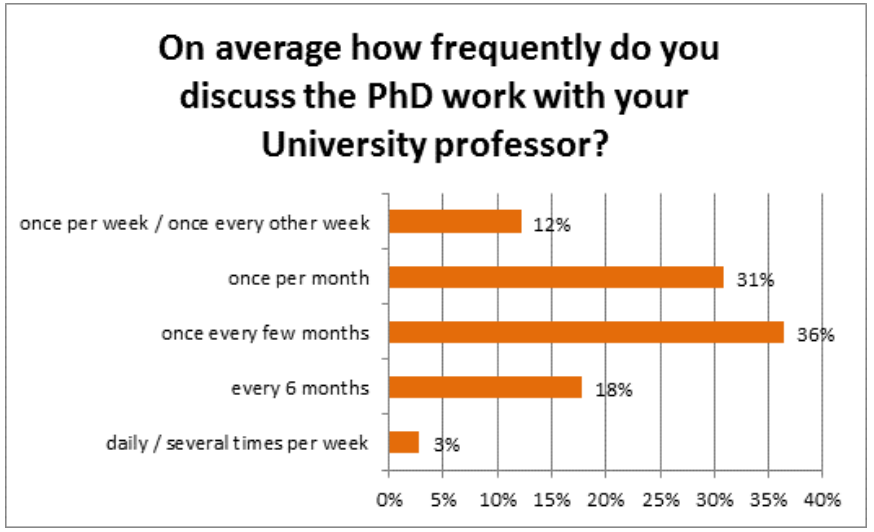


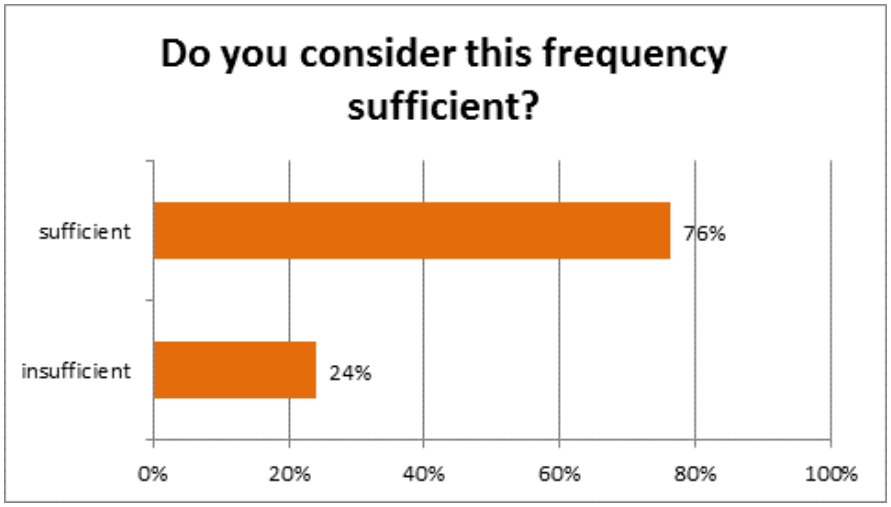


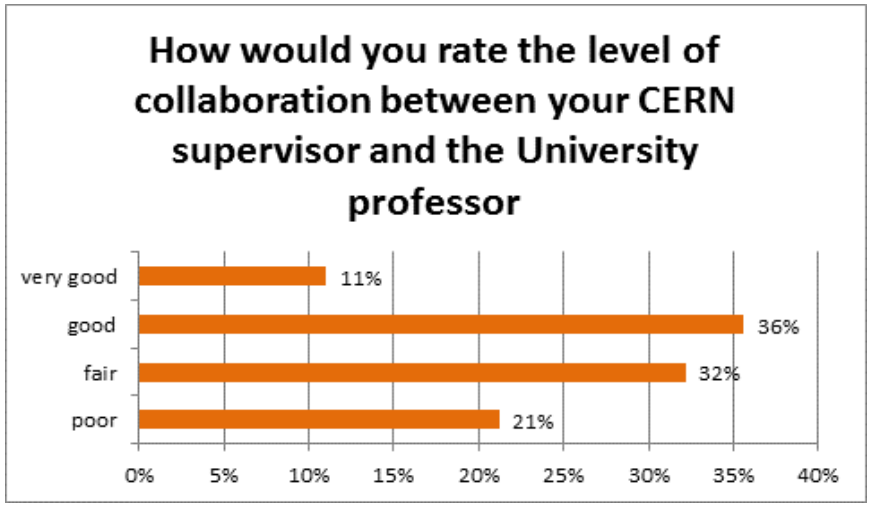
Questionnaire

Stephan Russenschuck



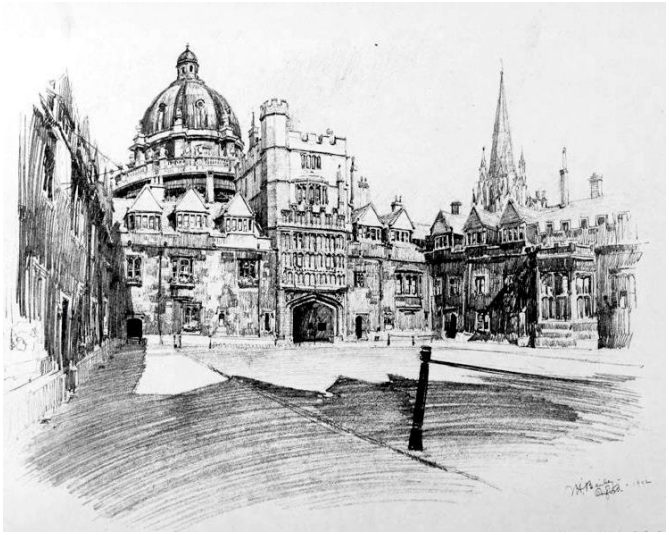






Academic Standing of Accelerator Research: EuCARD^2 uniting communities

Universities



Millenary tradition

?

Laboratories

Born since a century

"Universities meet Laboratories" was a pioneering attempt to bring together representatives of the academic world and of laboratories, in order to confront the interface of joint research, communication and collaborations.

The workshop revealed a unanimous consensus among the participants from universities across Europe: **the field of accelerator physics and technology appears often disadvantaged by an inadequate standing in the academic environment.**

Many **students do not choose accelerator physics as university study topic**. Most students are not even aware of accelerator physics as a possible career path. Greater efforts should be made to attract students in the first stage of their studies.

Joint PhD supervision is not an easy process: the needs of the laboratories do not always match with the university research interest. This issue was raised in the discussions by several workshop participants (e.g. in relation with CERN joint supervision of students).

Research assessments:

distinct difference of the research evaluation at universities and laboratories.
This difference does not only prevent some laboratory staff from competing for job posts at universities, but it also renders collaboration with laboratories less attractive for the university staff. Laboratories disseminate their work in conference proceedings (if at all); Universities consider only the publications in peer-reviewed journals.

Universities: **apply metric evaluation criteria like the h-factor too strictly** without taking into account specific aspects of accelerator physics and ignoring other relevant scientific outputs. Academic evaluation in Spain: only publications in journals with **high impact factor**.

Accelerator physics journals are suffering from a low impact factor, which is becoming a discriminating element in the research evaluation.

In most of the European countries: **self- organization** of the accelerator community (e.g. KfB, CONECTA), and with the support of the EPS-AG.

Training:
Positive impact of two major European accelerator schools - CAS and JUAS – as well as accelerator training at universities, with Germany leading the way.

UK: good experience with joint research, and including green field academic accelerator studies, but the overall situation remains complex

Quest for good students

A key to attractiveness, particularly for students, can be the multi/inter- disciplinary character of accelerator science.

Another advantage of the discipline, compared to fields like HEP or even nuclear physics, is that accelerator scientists can be both theorists and experimentalists at the same time.

With towards smaller, very sophisticated, accelerators,

closer connection between the accelerator scientists and the users, through approaches integrating these two communities.
At LAL, with the new ThomX facility, work is ongoing in this direction.

Some subfields of accelerator science have an atypical, exceptionally high academic standing.

In novel acceleration methods (laser plasma, etc...) researchers often publish in excellent journals & attract substantial funding.

What can be learnt from that community?

Final Remark

Several participants suggested the need for a deeper discussion of these subjects (another ULA?)