

Boost your career in accelerator science and technology:
attend the Joint Universities Accelerator School (JUAS)

Philippe Lebrun, Director

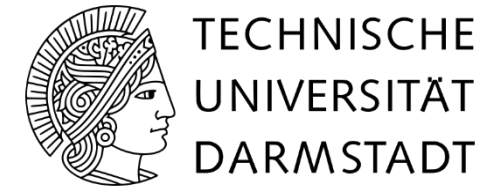
EASITrain Session, FCC Week
Amsterdam, 8-13 April 2018

JUAS mission

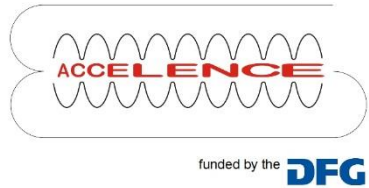
- Since 1994, the Joint Universities Accelerator School (JUAS) provides a unique training in the **science, technology and applications of particle accelerators** to graduate students from its Partner Universities, as well as from other institutions
- For this purpose, JUAS holds **two five-week courses** yearly at the European Scientific Institute (ESI) in Archamps, France, taught by renowned experts from universities and laboratories and accredited by the Partner Universities:
 - A course on the Science of Particle Accelerators
 - A course on the Technology and Applications of Particle Accelerators

www.juas.eu

16 Partner Universities



26 Sponsor Institutes and European Programs



ESI Archamps Technopole, host of JUAS



ESI Archamps Technopole, host of JUAS



Lecture hall



Computer room



Student foyer

JUAS pedagogy

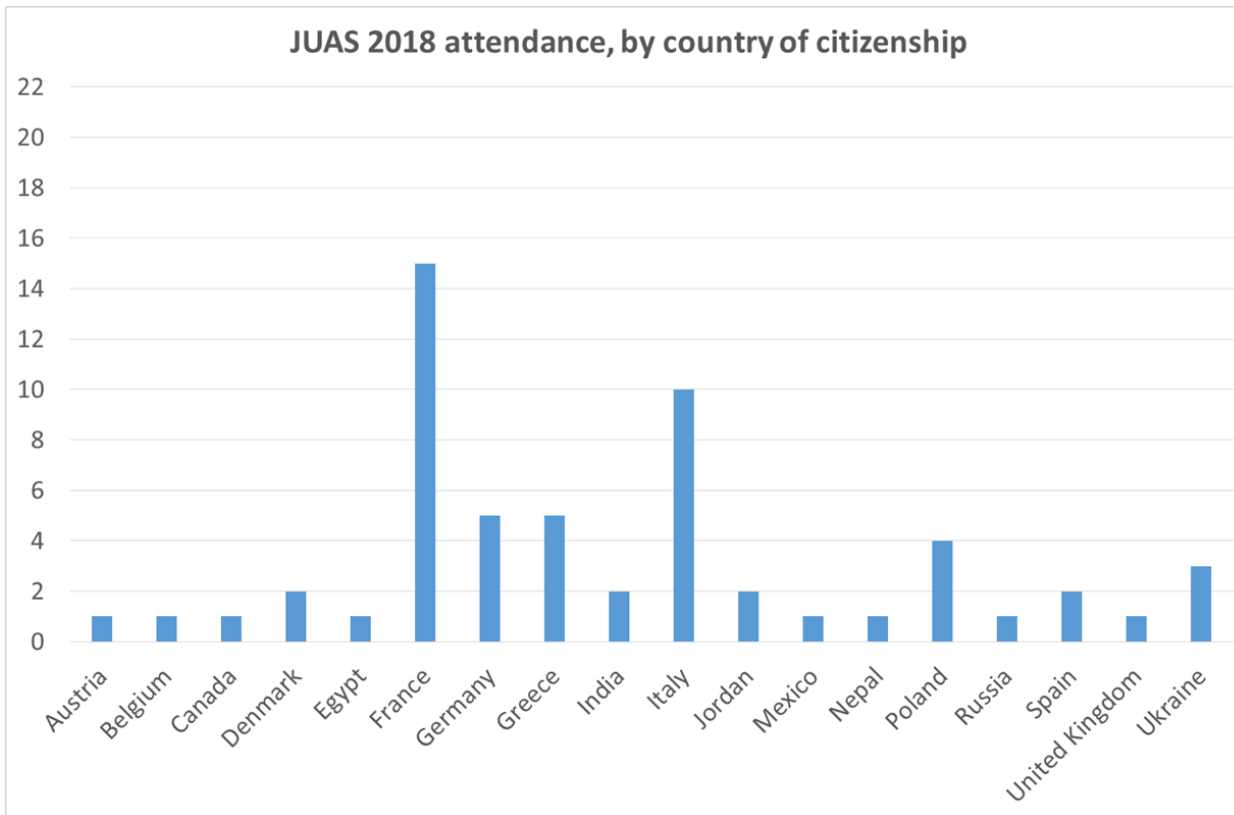
- Two courses, each 4 weeks + 1 week exams
 - *The science of particle accelerators*
 - *The technology and applications of particle accelerators*
- Expert lecturers from universities, national labs and CERN
- Lectures + tutorials + seminars + workshops + practical work + lab visits
- Syllabus and appointment of lecturers submitted to Advisory Board
- Lecture notes available on line and color-printed on paper
- «Refresher» lecture and tutorial documents (E-M, Relativity, RF, Magnets) available to students well before the course for personal work
- Written exams
- Written reports and oral presentations by students on design workshops and practical work
- Subjects grouped weekly, hence possibility to register by week for specific subjects

JUAS Student Certification

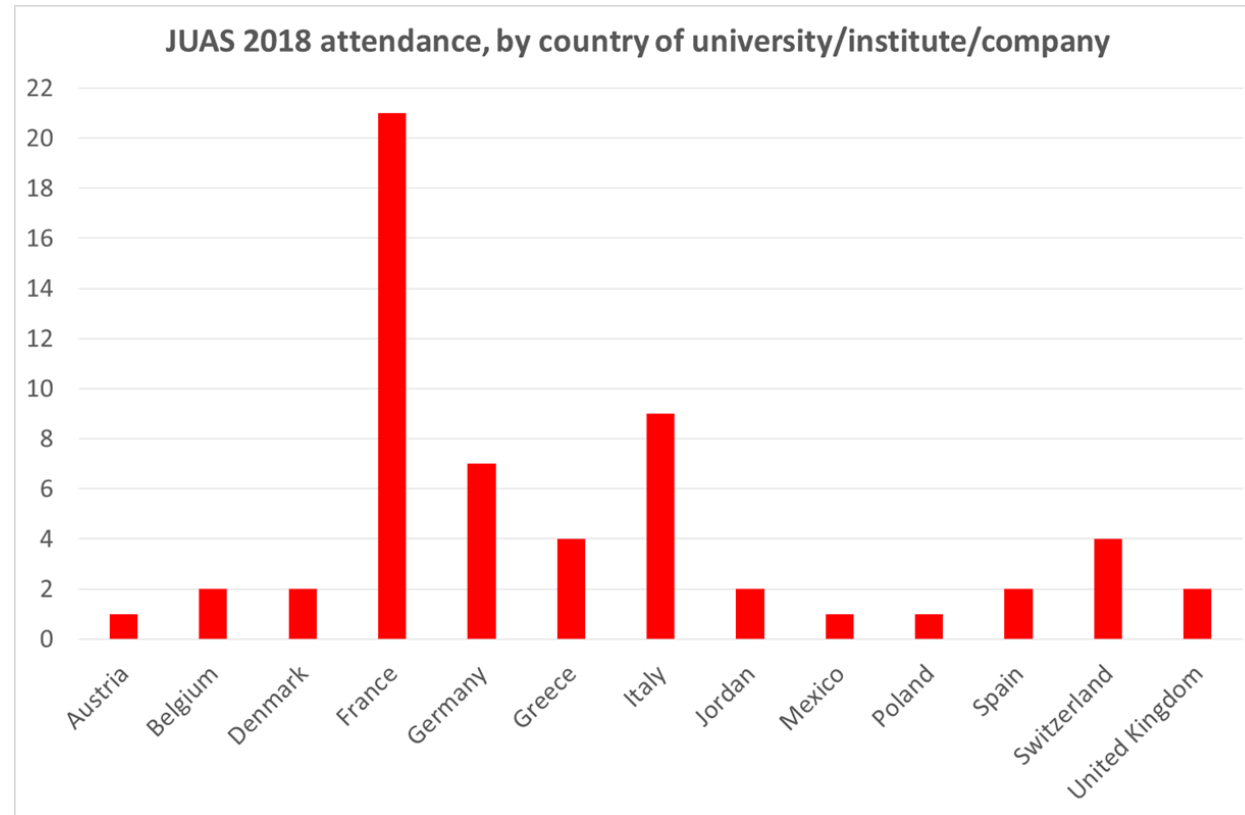
- JUAS and home institutions of students
 - Master Students: Partner University may give ECTS credits to their students who have passed the examination for each Course
 - Doctoral Students: credits may be given by the doctoral schools according to their own policy
 - Professionals: JUAS Course may be considered part of professional training («Formation Continue» in France)
- Certification
 - JUAS issues a Certificate for each Course containing all information
 - Subjects studied and numbers of hours
 - Exam taken or not
 - Marks obtained in relation to class averages
 - Student ranking

Origin of JUAS 2018 students

JUAS 2018 attendance, by country of citizenship



JUAS 2018 attendance, by country of university/institute/company



JUAS Course 1

The science of particle accelerators

8 January – 8 February 2018



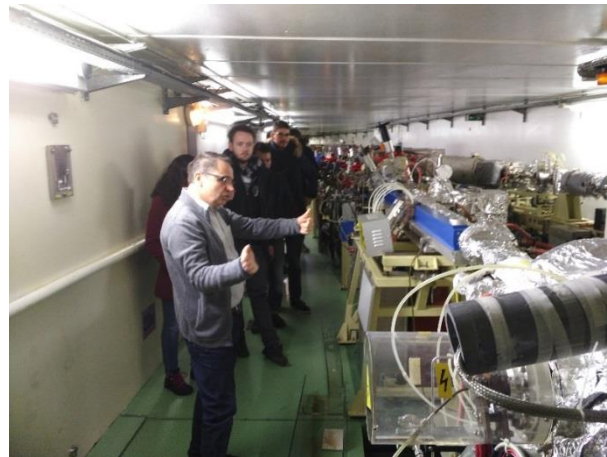
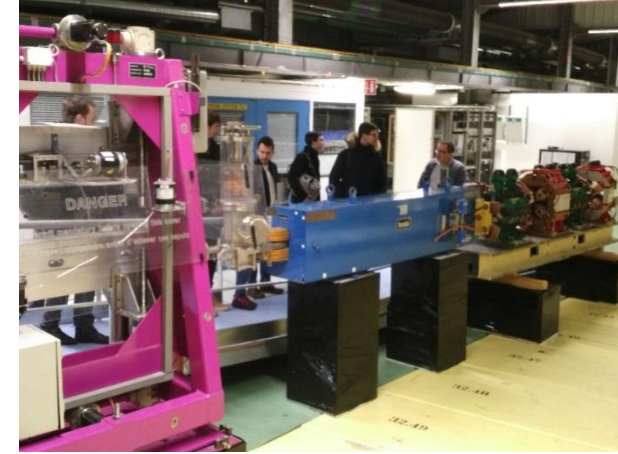
JUAS 2018 Course 1 in a nutshell [1/2]

Subjects	Lecturers	Hours
Relativity	H. Henke	4
Electromagnetism	H. Henke	4
Particle optics	J-M. De Conto	5
Introduction to accelerator design & mini-workshop	Ph. Bryant	8
Beam injection & extraction	Th. Perron	2
Longitudinal dynamics	E. Métral, B. Salvant	12
Linacs	J-B. Lallement	6
Cyclotrons	B. Jacquot	6
Transverse dynamics	A. Latina	12
MADX	G. Sterbini, A. Latina, H.G. Morales, N. Fuster Martinez	7
Space charge	M. Migliorati	5
Instabilities	M. Migliorati	3
Synchrotron radiation	R. Bartolini	12
Linear imperfections	H. Bartosik	6
Mini-workshop machine design & presentations	Ph. Bryant, R. Bartolini	8
Non-linear effects	H. Bartosik	4
Total		104

JUAS 2018 Course 1 in a nutshell [2/2]

Seminars	Lecturer	Hours
Particle accelerators, instruments of discovery	Ph. Lebrun	1
European projects for collaborative accelerator R&D	M. Vretenar	1
Introduction to CERN and the LHC	Ph. Lebrun	1
LHC and future high-energy accelerators	F. Bordry	1
The neutrino physics programme	A. Blondel	1
Free-electron lasers	E. Prat	1
The CERN accelerator network	R. Alemany	1
Future high-energy linear colliders	L. Rinolfi	1
Novel high-gradient particle accelerators	R. Assmann	1
Total		9
Visits	Contents	Half-days
CERN	LHC SC magnet hall, CERN Control Center	1
ESRF	Storage ring, control room, magnet & exp. Halls	2
Total		3

Visit at ESRF Grenoble Monday 15 January 2018



JUAS Course 2

The technology and applications of particle accelerators
12 February – 15 March 2018



JUAS 2018 Course 2 in a nutshell [1/2]

Subjects	Lecturers	Hours
Introduction to practical days at CERN	F. Caspers, V. Baglin, J. Bauche, J. Fleiter, W. Farabolini	2
Introduction to RF	A. Mostacci	2
Vacuum systems	V. Baglin, R. Kersevan	7
RF engineering	F. Caspers, M. Wendt	10
Beam instrumentation	P. Forck	12
Superconducting RF cavities	F. Caspers	6
Accelerator controls	E. Zimoch	2
Introduction to magnets	A. Milanese	1.5
Normal-conducting magnets	T. Zicker	6.5
Superconducting magnets	P. Ferracin, Ph. Lebrun	6
Mini-workshop NC magnets	J. Bauche, T. Zickler	3
Mini-workshop SC magnets	P. Ferracin, Ph. Lebrun	3
Particle sources	T. Thuillier	5
Low-energy electron accelerators	W. Mondelaers	3
Accelerators for medical and industrial applications	W. Kleeven	3
Life-cycle & reliability of particle accelerators	S. Meyronenc	3
High-current proton linacs	S. Bousson	3
Radiation safety	X. Queralt	3
Total		81

JUAS 2018 Course 2 in a nutshell [2/2]

Seminars	Lecturer	Hours
Accelerator-driven systems	J.L. Biarotte	1
Building large accelerators	Ph. Lebrun	1
Accelerators for hadron therapy	M. Schippers	1
Novel accelerators	R. Ischebeck	1
From methodology of inventiveness to applications	A. Seryi	1
Radiation oncology: biology, physics, clinical applications	R. Miralbell	1
Total		6
Visits	Contents	Half-days
CERN	AD, Linacs, LEIR, thin film coatings	1
PSI	Cyclotrons, proton therapy, Swiss-FEL	4
Hopital Universitaire Genève	Therapeutic applications of accelerators	1
Total		6
Practical work	Contents	Half-days
CERN	RF, Vacuum, Magnets, Superconductivity	4
Bergoz Instrumentation	Visit of company, electronic design	2
Oral reports on practical days at CERN	An exercise in oral presentation of scientific work	1
Total		7

Visit at PSI Villigen 22-23 Feb 2018

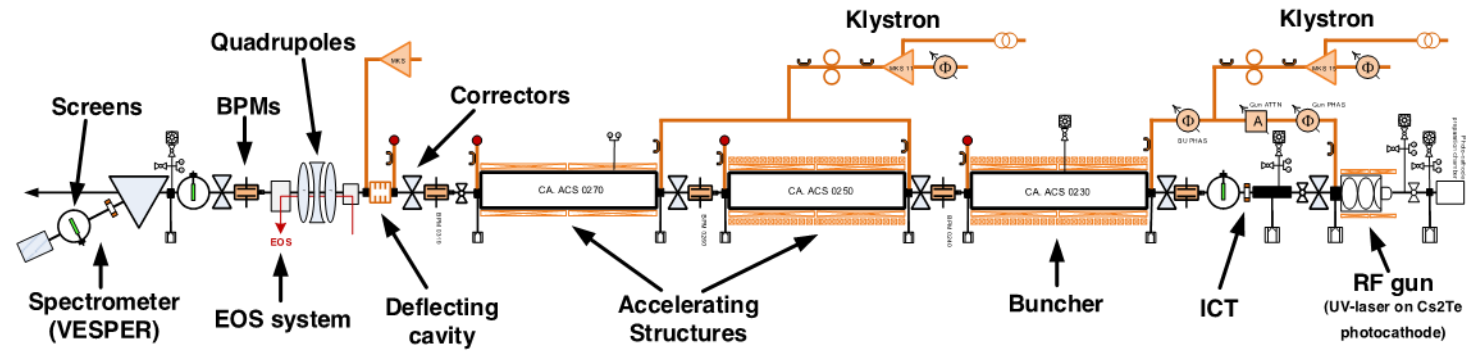


Mini-workshops NC and SC magnets

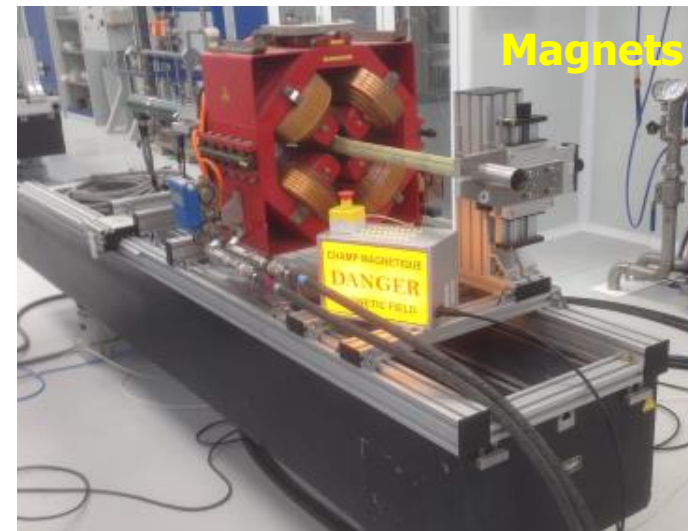


Practical day at CERN 2 March 2018

Beam measurements on CLEAR



Ph. Lebrun



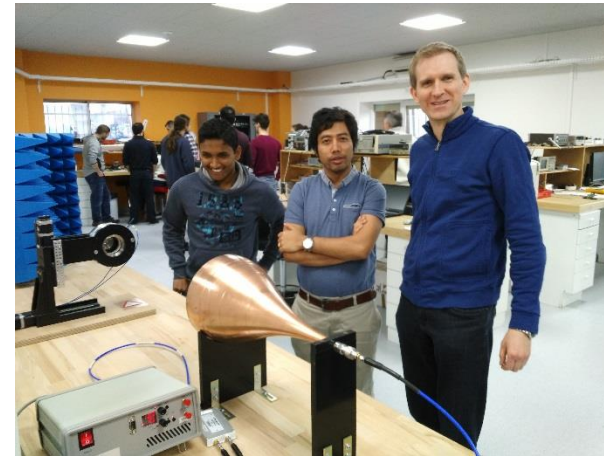
FCC Week 2018 Amsterdam



Visit at Hôpital Universitaire de Genève, radio-oncology service 8 March 2018



Practical day at BERGOZ INSTRUMENTATION 7 March 2018



A few messages of appreciation received

- *The courses really helped me with the realization of my Master project and motivated me to continue my career in accelerator physics*
 - Nuria, University of Valencia, Spain
- *An invaluable opportunity to have top-level professionals as lecturers*
 - Vittorio, University of Roma La Sapienza, Italy
- *The visits were awesome opportunities to meet experts in their place of work*
 - Antoine, Université Paris-Sud, France
- *I made valuable friendships with interesting and open-minded people from all over the world*
 - Maciej, University of Wroclaw, Poland
- *The best course I attended in my life*
 - Dinesh, Manipal University, India

JUAS alumna gets best poster award at the FCC week 2017 in Berlin

The study of Future Circular Colliders (FCC) – very large particle accelerators for high-energy physics beyond the LHC – initiated in 2014 by CERN and conducted in international collaboration, held its third annual workshop in Berlin from 29 May to 2 June 2017.



Eleonora Belli receiving best poster award at FCC week from Frank Zimmermann (CERN) and Bruce Strauss (US Department of Energy)

<https://fccw2017.web.cern.ch/>

Eleonora Belli, doctoral student of Professor Mauro Migliorati from Università di Roma "La Sapienza" and presently doing her thesis work at CERN, obtained the best poster award at the FCC week in Berlin for her work on "Collective effects in the interaction region of FCC-ee". Eleonora is a former student of JUAS, where she attended the course on technology and applications of accelerators in 2014, and the course on science of accelerators in 2016.

Prize for best JUAS student to attend IPAC Conference



Simon Vallières
INRS Canada &
Université de Bordeaux

Next session 7 January to 15 March 2019
Applications on line until mid-October 2018

