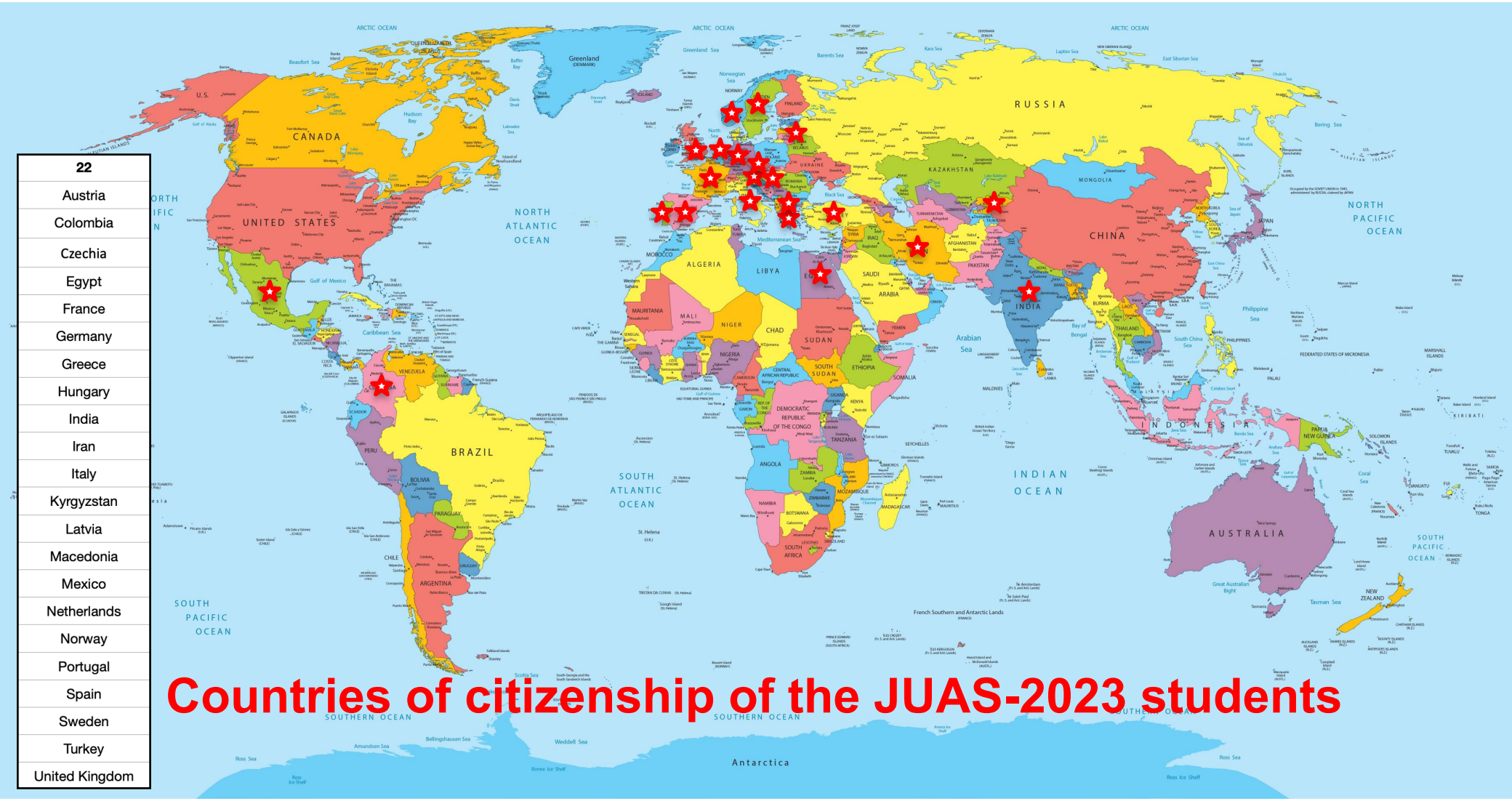
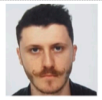
Welcome to JUAS-2023!

E. Métral (CERN, elias.metral@cern.ch): JUAS director



56 participants

Course 1 (30 participants)

 **Ioannis ANGELIS** *(Greece)* PhD Aristotle University	 **Davide ANNUCCI** *(Italy)* PhD La Sapienza	 **Max BEGUE** *(France)* Master INP Phelma	 **Damien BLONDEAU-PATISSIER** *(France)* Master INP Phelma	 **Romain BOSSOUTROT** *(France)* Master INP Phelma
 **Giacomo BROGGI** *(Italy)* PhD La Sapienza	 **Giovanni CAMPRI** *(Italy)* PhD La Sapienza	 **Luca CASTELLI** *(Italy)* PhD La Sapienza	 **Francesco DEMURTAS** *(Italy)* PhD La Sapienza	 **Vittorio FERRENTINO** *(Italy)* PhD Univ. of Naples Federico II / CERN
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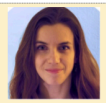
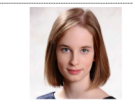
 **Alice VANEL** *(France)* Professionnal CERN	 **Dora Erzsebet VERES** *(Hungary)* PhD Goethe Univ. Frankfurt / CERN	 **Zdenek VOSTREL** *(Czech Republic)* Master Czech Technical University / CERN	 **Elias WAAGAARD** *(Sweden)* PhD EPFL / CERN	 **Daniel ZEITZ** *(Austria)* Master Vienna Univ. Technology / CERN

Yellow background = Participation « à la carte »
(nationality)

Course 2 (38 participants)

 **Mohamed Samir ABDELHALIM** *(Egypt)* Master LASCALA	 **Helena ALAMPRESE** *(Italy)* Master La Sapienza	 **Aras AMINI** *(Iran)* Master LASCALA	 **Davide ANNUCCI** *(Italy)* PhD La Sapienza	 **Lorenzo BALCONI** *(Italy)* PhD Università degli studi di Milano
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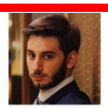
 **Giacomo BROGGI** *(Italy)* PhD La Sapienza	 **Giovanni CAMPRI** *(Italy)* PhD La Sapienza	 **Luca CASTELLI** *(Italy)* PhD La Sapienza	 **Francesco DEMURTAS** *(Italy)* PhD La Sapienza	 **Vittorio FERRENTINO** *(Italy)* PhD Univ. of Naples Federico II / CERN
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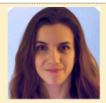
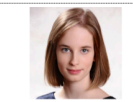
 **Alice VANEL** *(France)* Professionnal CERN	 **Dora Erzsebet VERES** *(Hungary)* PhD Goethe Univ. Frankfurt / CERN	 **Zdenek VOSTREL** *(Czech Republic)* Master Czech Technical University / CERN	 **Elias WAAGAARD** *(Sweden)* PhD EPFL / CERN	 **Daniel ZEITZ** *(Austria)* Master Vienna Univ. Technology / CERN

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Courses 1&2 (12)

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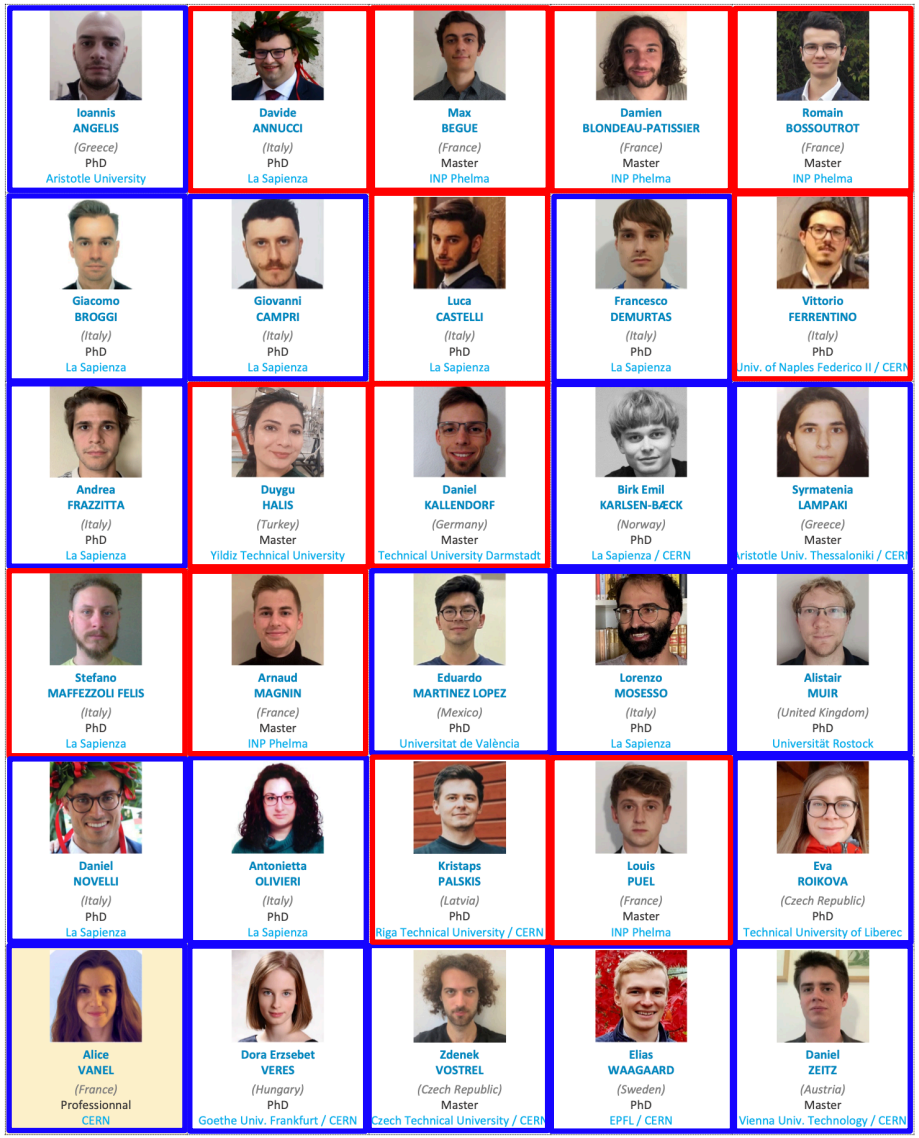

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Course 2 (38 participants)

Courses 1&2 (12)
Course 1 (18)
Course 2 (26)

Yellow background = Participation « à la carte »
(nationality)

Welcome to JUAS-2023!

E. Métral (CERN, elias.metral@cern.ch): JUAS director

The JUAS Team at your service

Elias METRAL

CERN

Principal Accelerator Physicist

Director

Bob HOLLAND

ESI

Director

Management

Stéphanie VANDERGOOTEN

ESI

Project Manager

Coordinator

Mélanie CASTELLE

ESI

Project Officer

Coordinator

ESI opens at **8:30** every morning (doors close at the end of the daily program)

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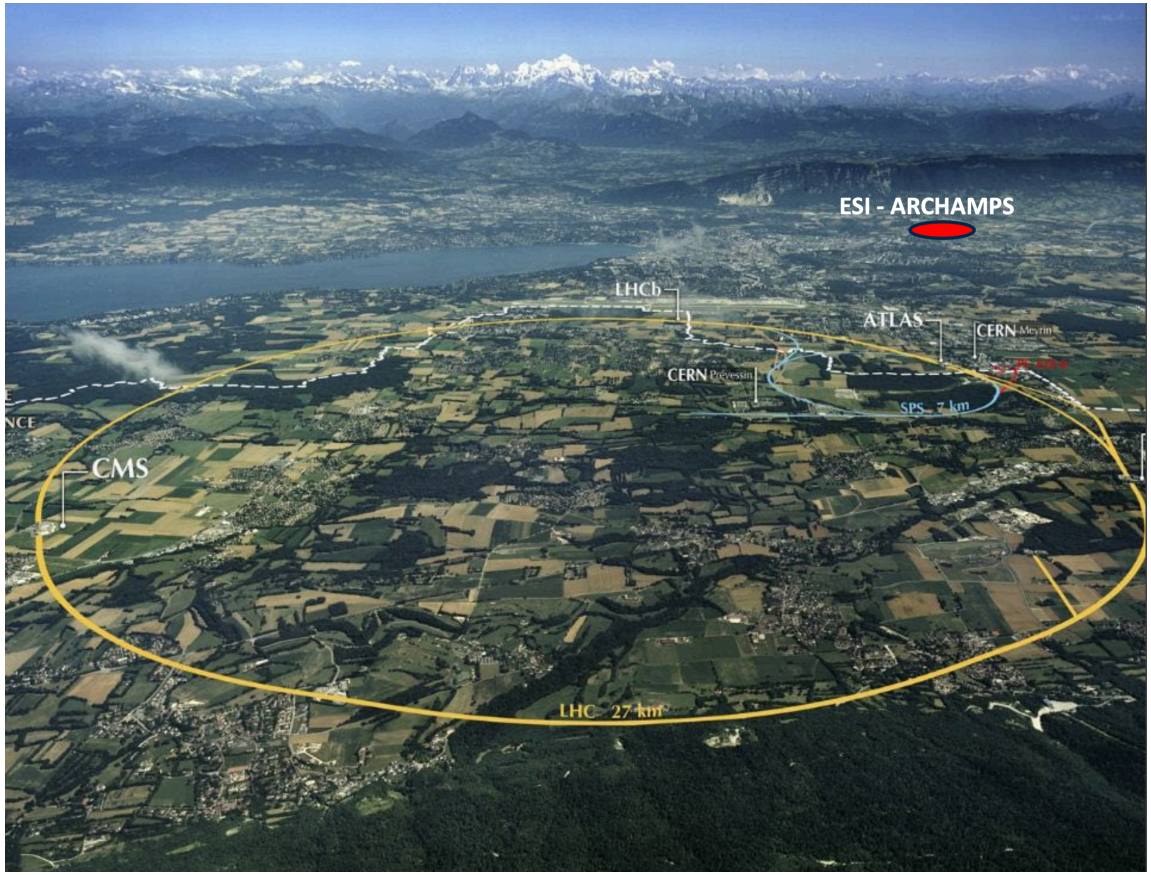

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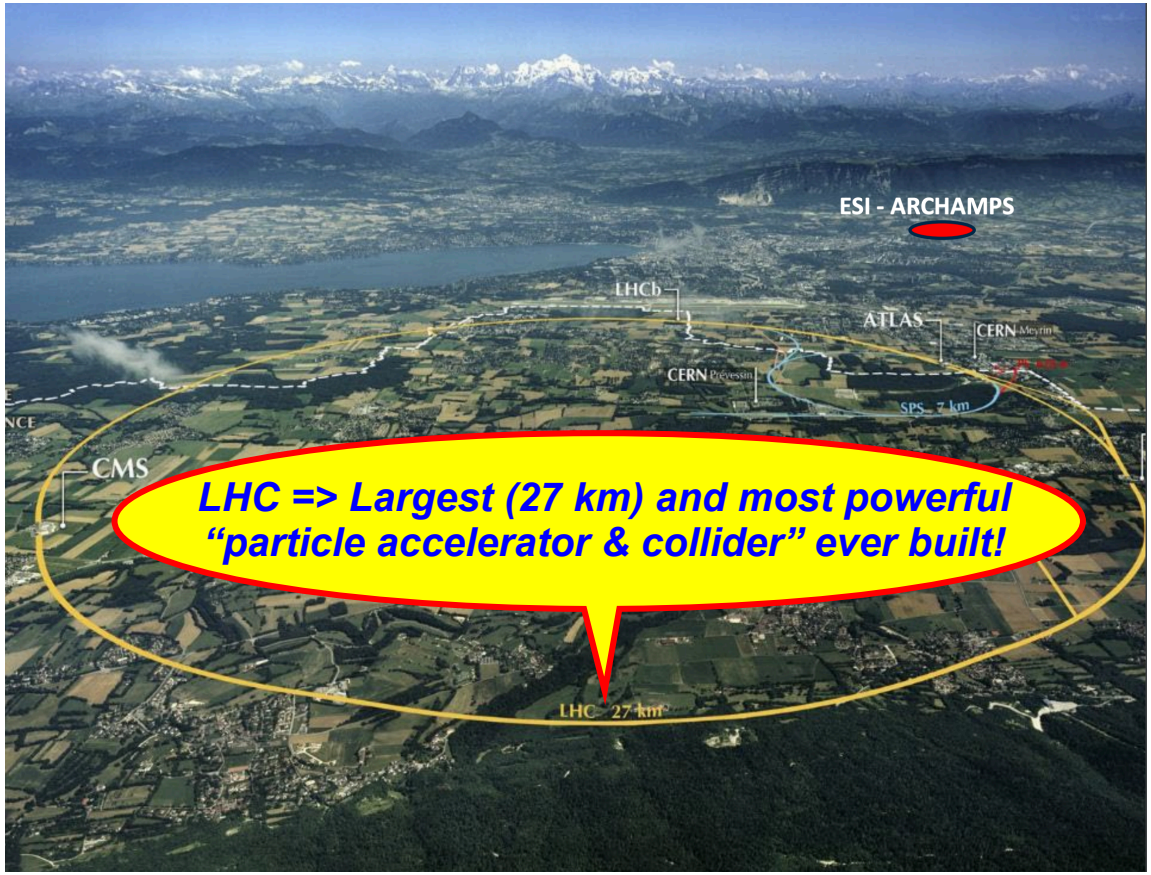

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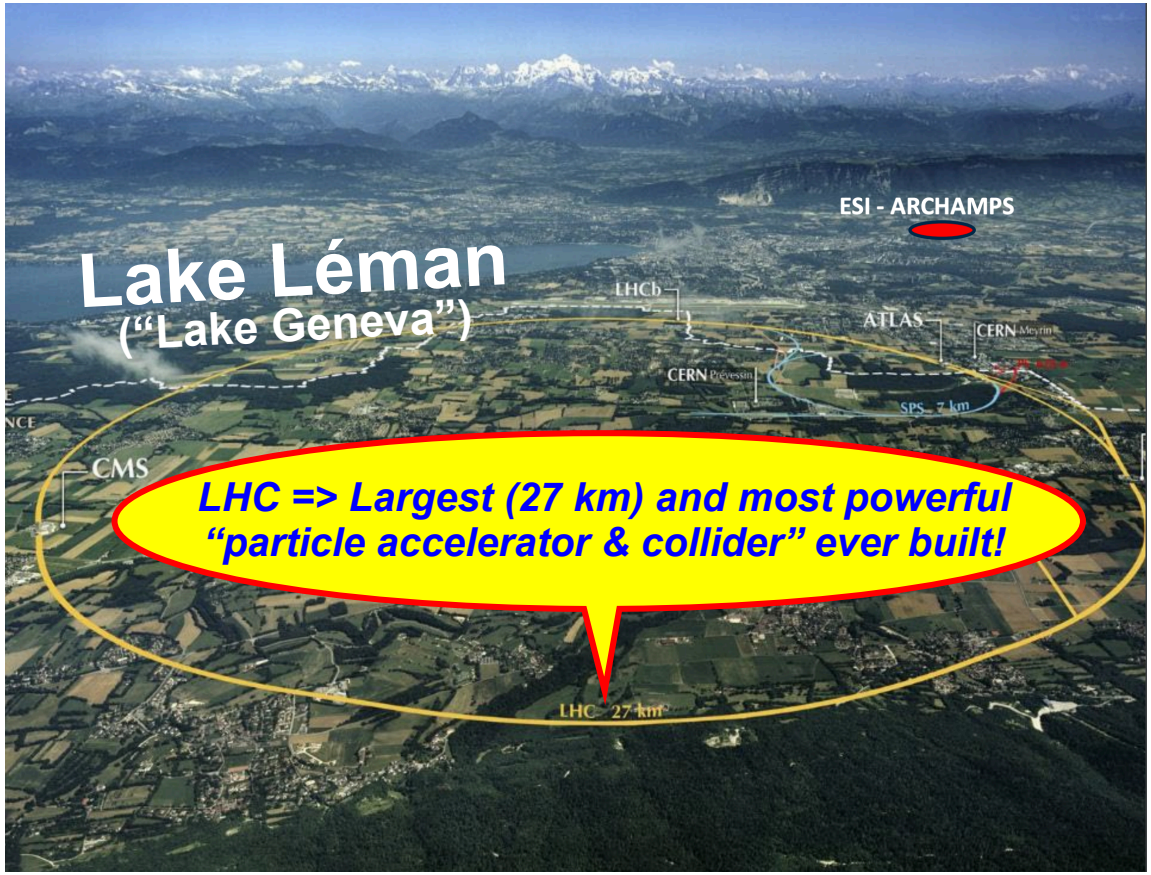

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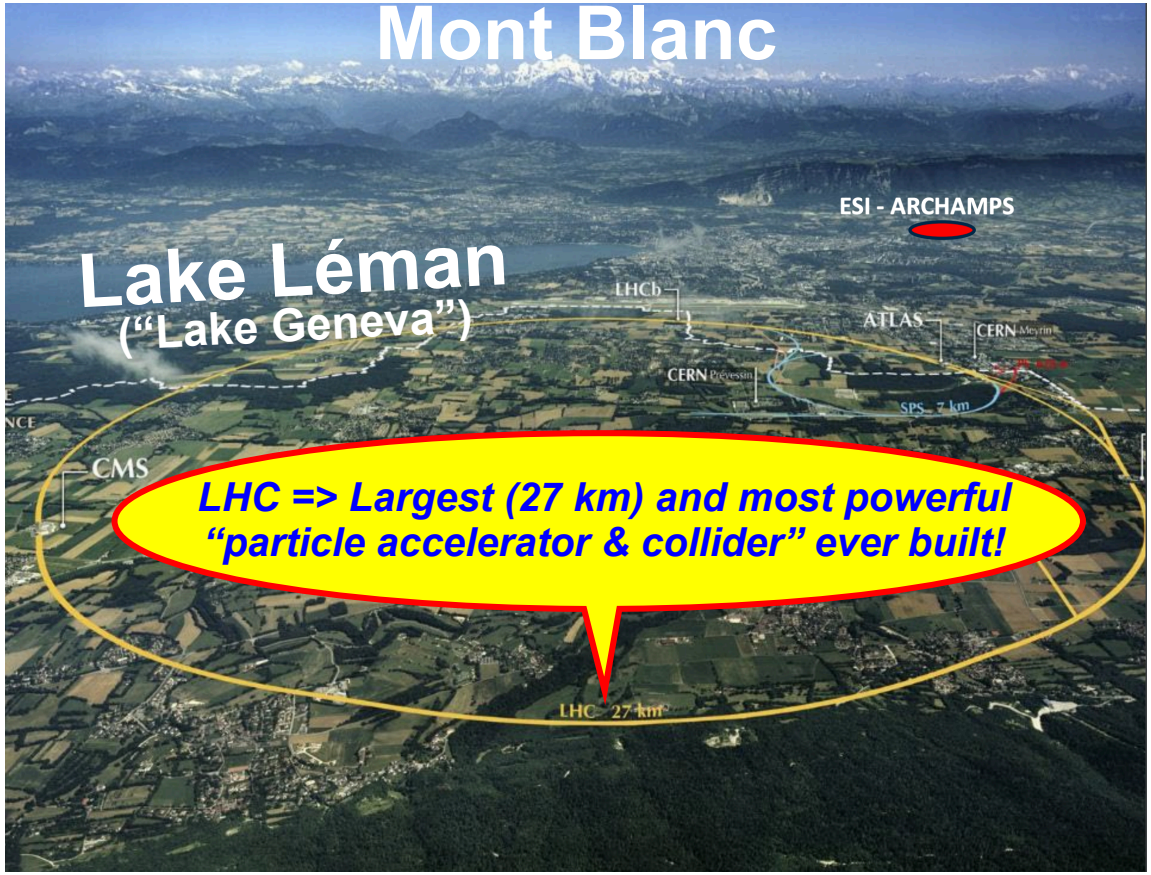

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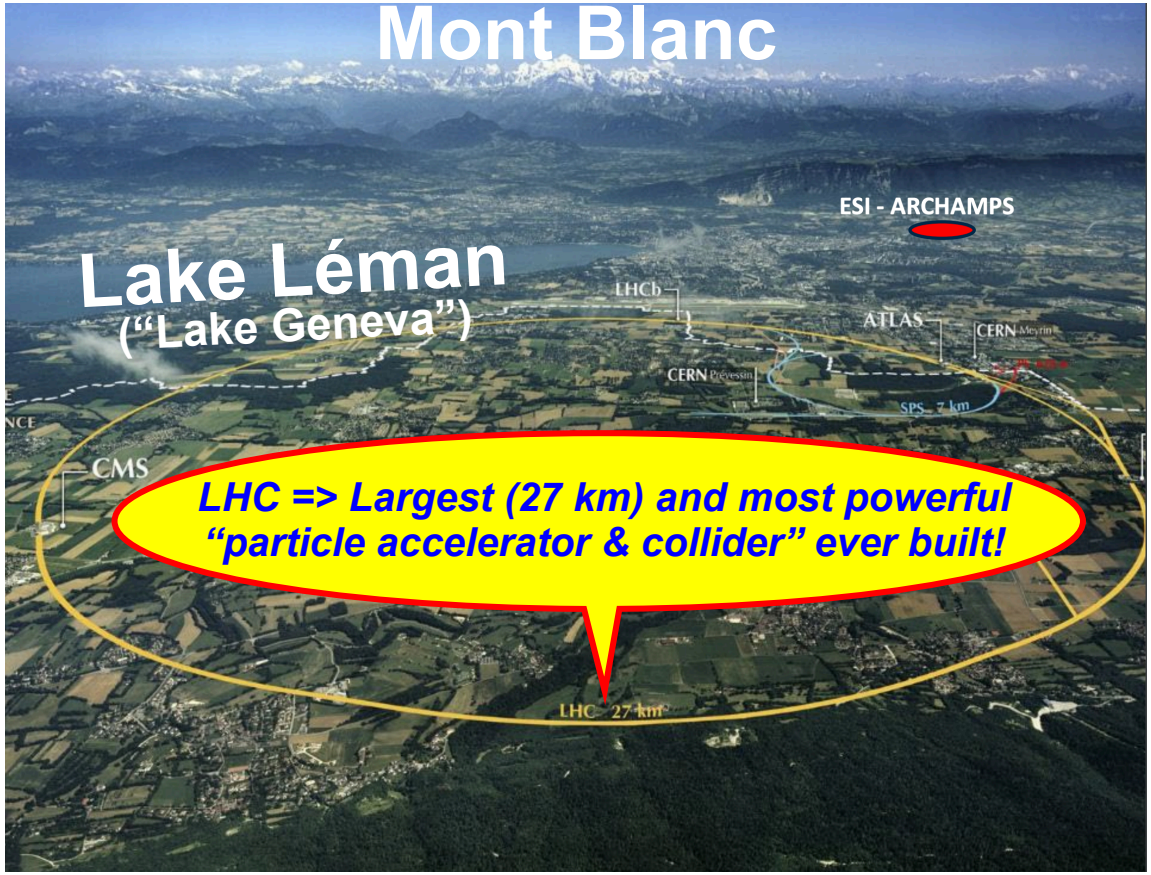

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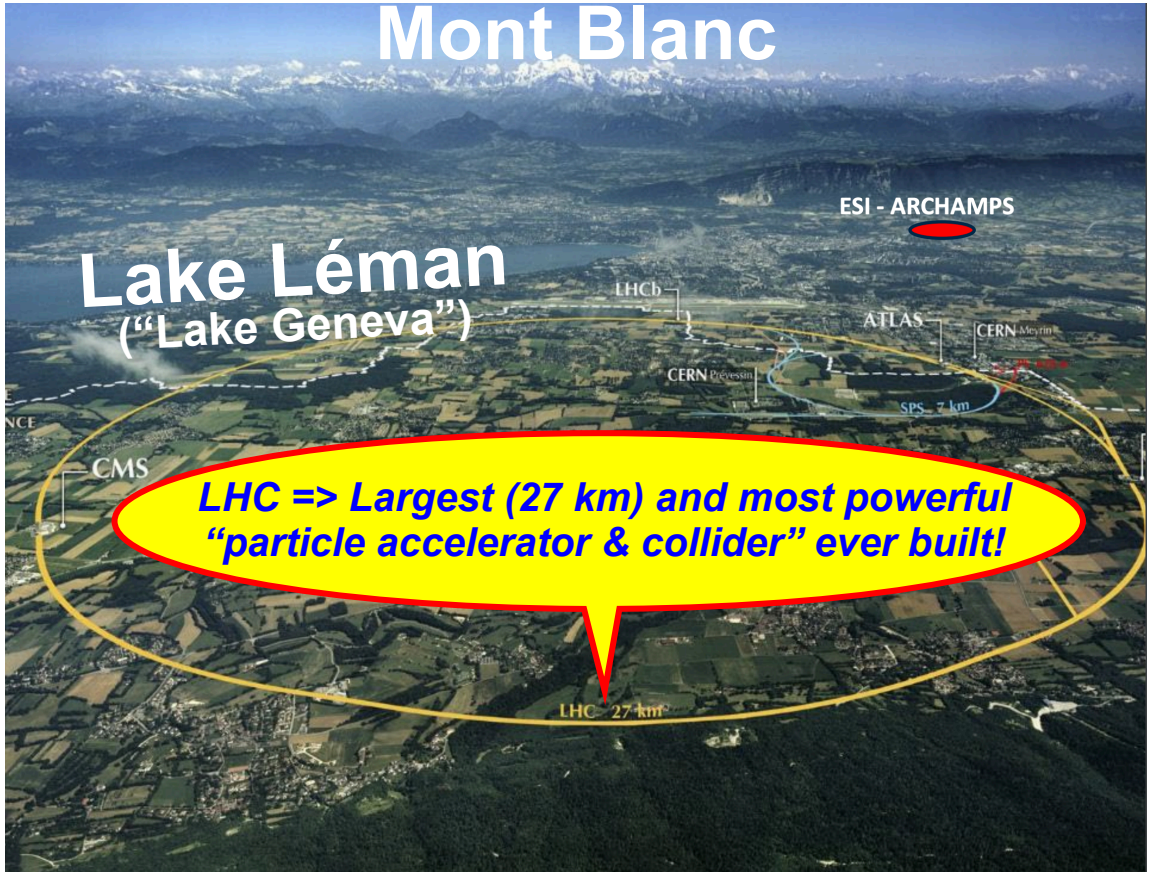

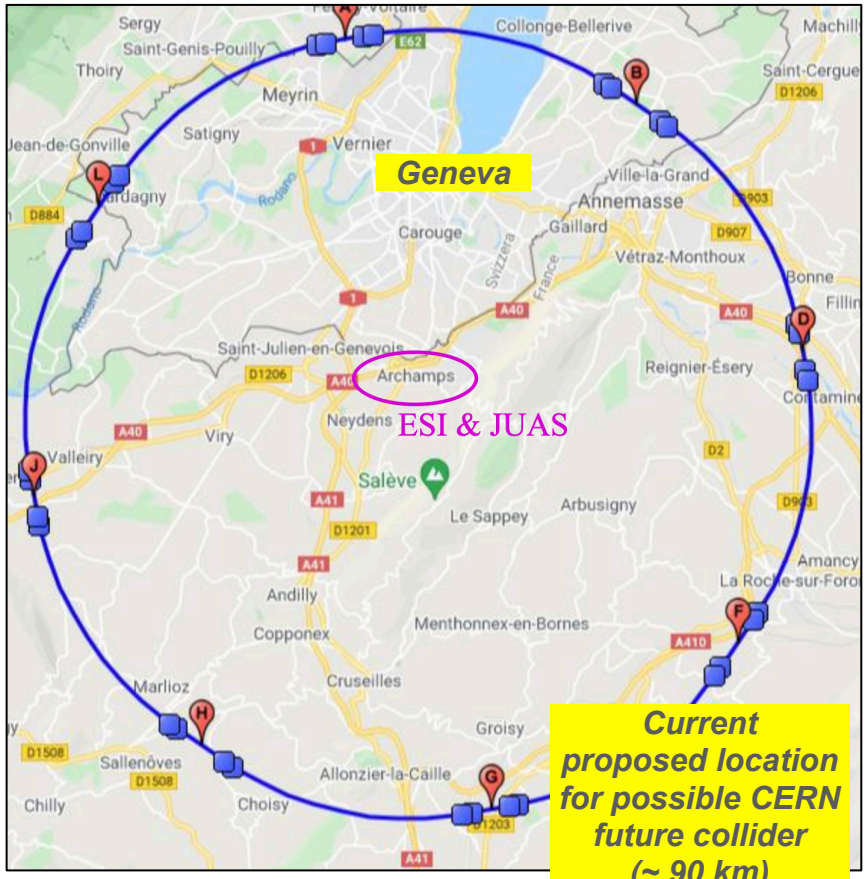

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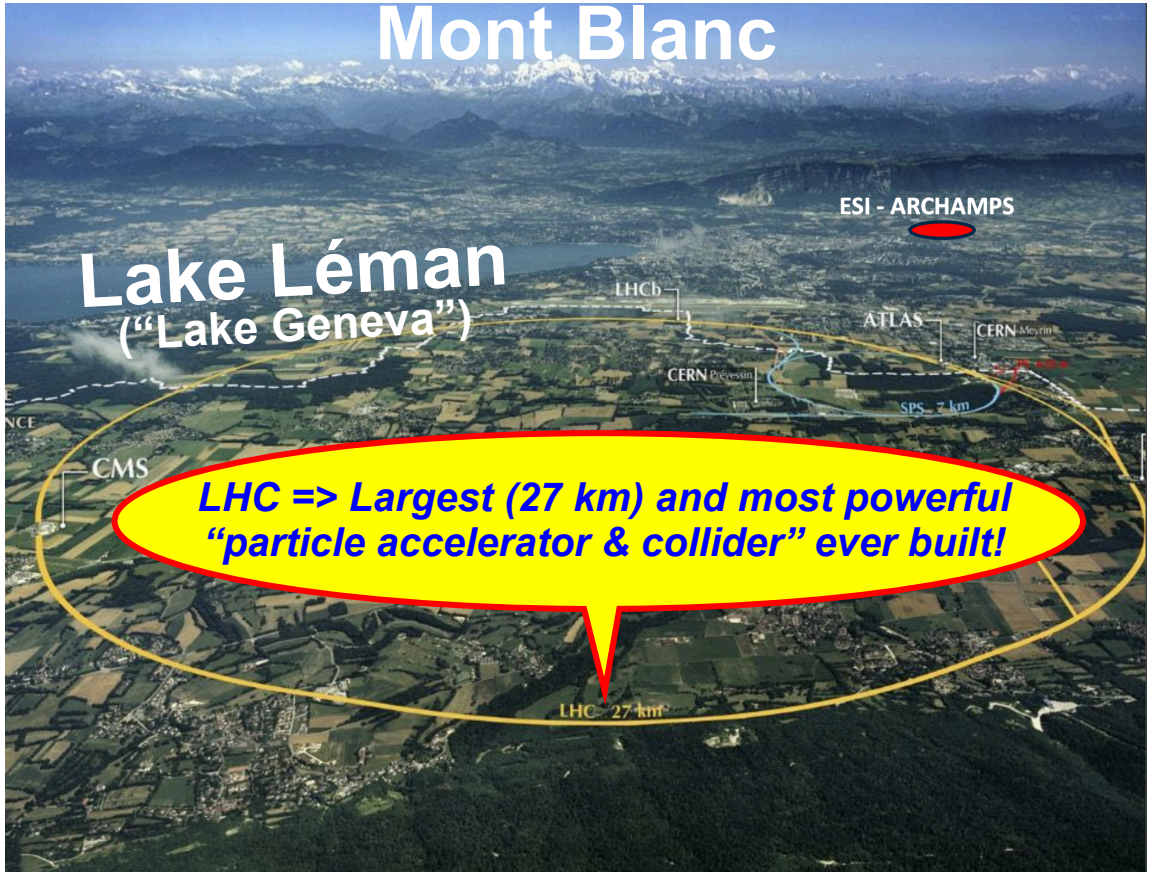
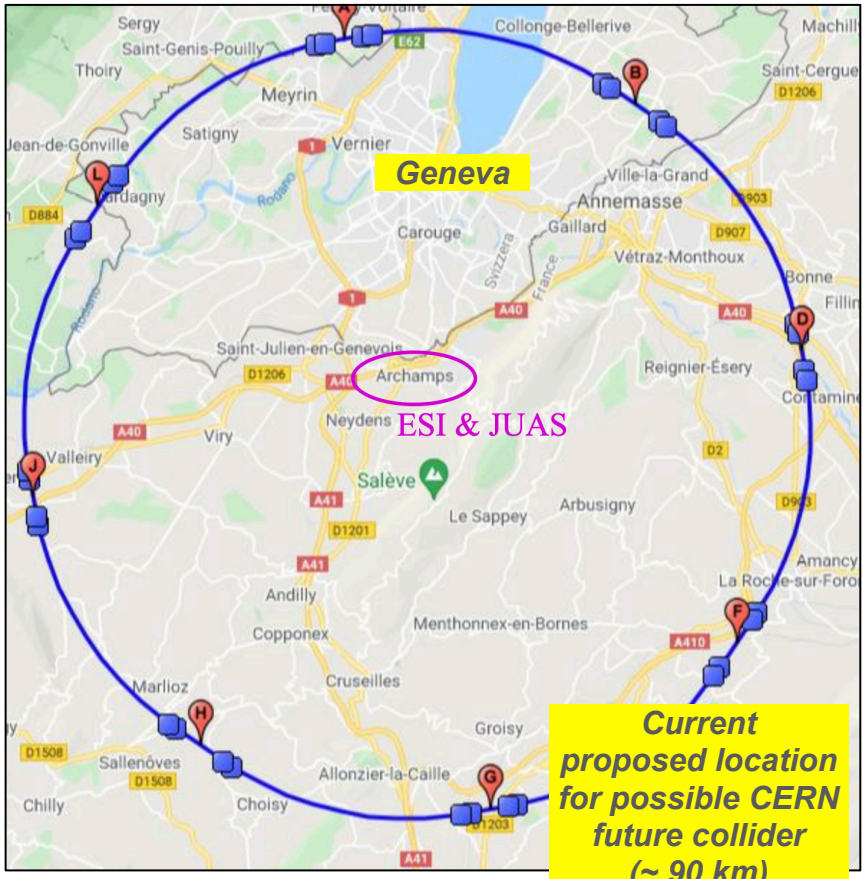
Course 1: The Science of Particle Accelerators (09/01-10/02)
Course 2: The Technology and Applications of Particle Accelerators (13/02-17/03)





2 courses => 2 INDICO web pages

JUAS 2023 (Course 1): The Science of Particle Accelerators

https://indico.cern.ch/event/1210739/

9 January 2023 to 10 February 2023
European Scientific Institute (ESI)
Europe/Paris timezone

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Softwares
Pre-requisite & useful videos
Timetable
Examinations
IPAC Prize 2023

Stéphanie VANDERGOOTEN (Project manager, ESI)
JUAS@esi-archamps.eu
+33 4 50 39 05 49

NOTE: 1 slot of 1 hour = 50 minutes lecture + 10 minutes break

Starts 9 Jan 2023, 11:00
Ends 10 Feb 2023, 14:30
Europe/Paris

Elias Metral

Registration
Registration for this event is currently

JUAS 2023 (Course 2): The Technology & Applications of Particle Accelerators

https://indico.cern.ch/event/1214547/

13 February 2023 to 17 March 2023
European Scientific Institute (ESI)
Europe/Paris timezone

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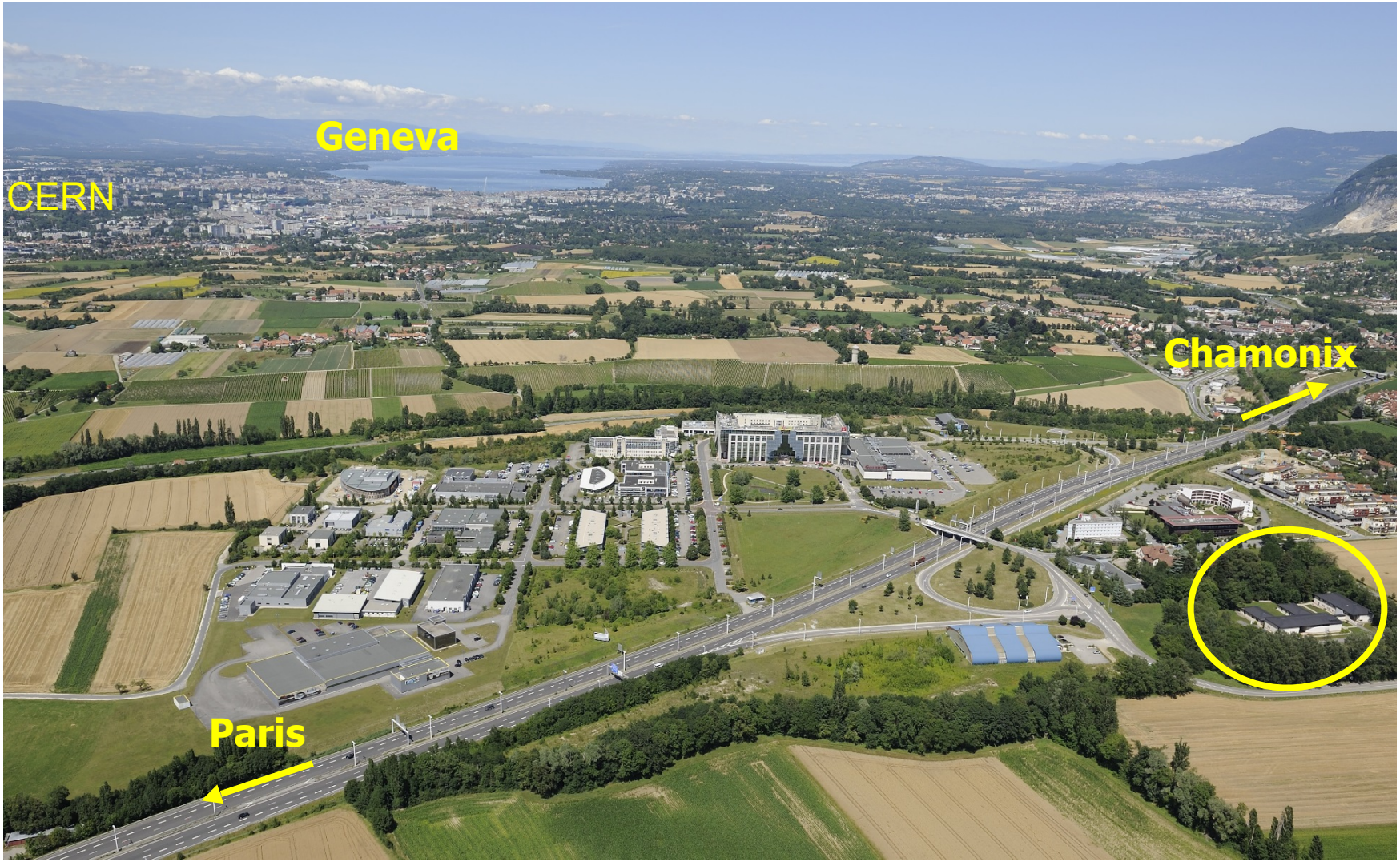
Elias Metral

European Scientific Institute (ESI)
61 rue Antoine Redier
Building "Mont Blanc 1"
74160 Archamps
Go to map

JUAS 2023 - Photo Gallery - Course 2 - Parti...

ESI host of JUAS, located in ArchParc, Archamps, France



ESI host of JUAS, located in ArchParc, Archamps, France

Lecture hall

Computer room

Student foyer

A brief history of JUAS

- **Origins (1994)**
  - Accelerator courses given by CERN staff at Université Joseph Fourier in Grenoble
  - Creation of ESI by Département de la Haute-Savoie (France) – previous presentation

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  - F. Méot: 2006–2010
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  - J. Jowett: 2021
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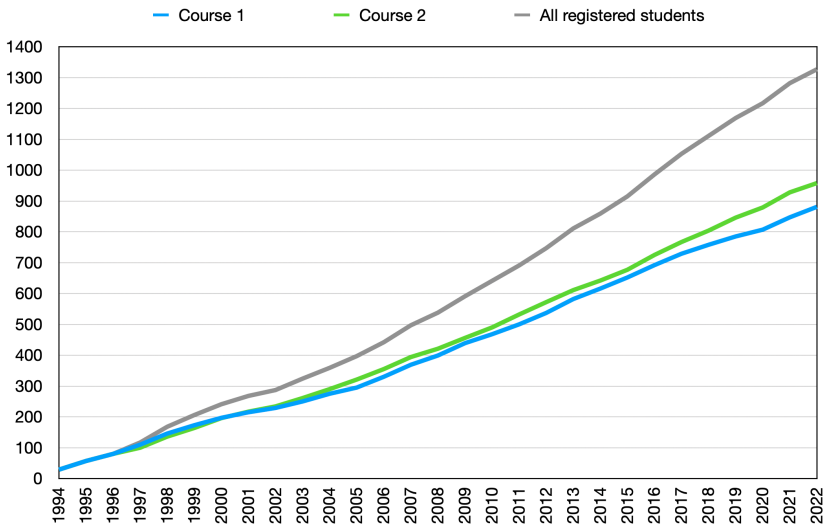
- **More than 1300 students trained so far**



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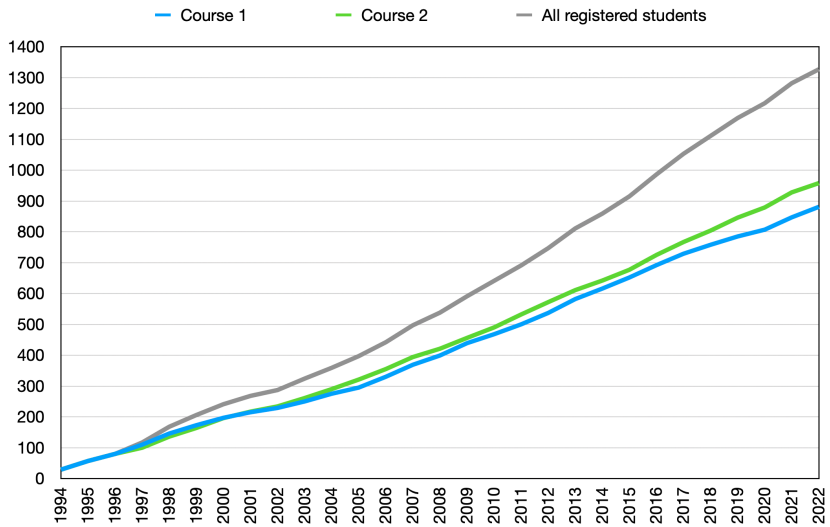
- JUAS **alumni active in many accelerator laboratories worldwide**



JUAS mission

- **Invented a century ago** as instruments of basic science, particle accelerators have also become essential tools of applied science, engineering and medicine. There are **today more than 40 000 particle accelerators** in operation worldwide. Their design, construction and operation have developed into a specific domain of science and technology, resulting in a growing demand for training

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- Depending on the availability of places, **JUAS also welcomes graduate students from other universities as well as professionals**

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- Depending on the availability of places, **JUAS also welcomes graduate students from other universities as well as professionals**
- Additionally, **JUAS contributes to knowledge dissemination and outreach** in the field of particle accelerators

JUAS Partner Universities

UNIVERSITAT POLITÈCNICA DE CATALUNYA BARCELONATECH

Universitat Autònoma de Barcelona

TECHNISCHE UNIVERSITÄT DARMSTADT

UNIVERSITÀ DEGLI STUDI DI GENOVA

GRENOBLE INP UGA

umcg

Karlsruhe Institute of Technology

UNIVERSITY OF LIVERPOOL

Università degli Studi di Napoli Federico II

UNIVERSITY OF OXFORD

université PARIS-SACLAY

SAPIENZA Università di Roma

Universität Rostock

VNIVERSITAT DE VALÈNCIA

JUAS collaborating institutes and programmes

Myself (answering to the questions Stéphanie sent to all of us)

Name: Elias Métral

➢ Who I am? ➢ Why I chose to attend JUAS? ➢ What I hope to be doing 5 years from now?

My best quality	My worst flaw	I have a passion for	It makes me angry

Myself (answering to the questions Stéphanie sent to all of us)

Name: Elias Métral

➢ Who I am? ➢ Why I chose to attend JUAS? ➢ What I hope to be doing 5 years from now?

My best quality	My worst flaw	I have a passion for	It makes me angry
			

Myself (answering to the questions Stéphanie sent to all of us)

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juas Joint Universities Accelerator School

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My best quality

My worst flaw

I have a passion for

It makes me angry

Anyone can become angry -
that is easy.
To be angry with the right person to
the right degree at the right time
in the right way... that is not easy

Aristotle

Myself

Dr. Elias Métral

Dr. Elias METRAL

Dr. Elias Métral graduated as a physicist engineer from the École Nationale Supérieure de Physique de Grenoble (France) and has Masters and PhD degrees (Coupled Landau damping of transverse coherent instabilities in particle accelerators) from the Université Joseph Fourier in Grenoble, now Université Grenoble-Alpes.

Elias is a senior accelerator physicist of the CERN Beams Department, who has been working on different particle accelerators for twenty-five years (as of 2021): after having been in the past machine supervisor for the PS and the SPS machines, and coordinator for the machine development studies in the LHC injector chain, he is currently one of the LHC machine coordinators since 2018. With an expertise in collective effects, he was the leader of the Hadron Synchrotron Collective/Coherent effects section within the Accelerators and Beam Physics group, between 2010 and 2020.

Since 2012, Elias has been the leader of the Task on Collective Effects for the future High-Luminosity LHC. He has been a member of the ICFA (International Committee for Future Accelerators) Beam Dynamics Panel since 2011 and the deputy chair since 2019. Since the beginning of 2021, he has been also a member of the muon beam panel of the new forming International Muon Collider Collaboration and he has been leading the beam dynamics working group.

As well as publishing numerous papers and regularly participating in international conferences, Elias has also frequently spoken at specialist workshops, often acting as convener or co-chair, and has lectured at several international schools.

A former student of the Joint Universities Accelerator School (JUAS) and a former assistant lecturer, Elias has been the lecturer for the course on Longitudinal Beam dynamics since 2011, the deputy director of the School since 2014 and the director since August 2021.

Welcome from the Director

After almost a century of spectacular innovation and development, particle accelerators continue to drive scientific discovery, human welfare and economic growth in fields as disparate as medical therapy, material science, biology, nuclear physics, matter in extreme conditions, and the probing of the fundamental particles and forces of Nature.

The technologies that have built our modern world, and the conceptual framework through which we perceive it, would be unimaginable without them.

The Joint Universities Accelerator School (JUAS) has provided postgraduate-level education in the science and technology of particle accelerators to well over a thousand students since 1994. Most have earned credits towards Masters or Doctoral degrees at our Partner Universities in Europe, while students at other universities around the world and early-career professionals have sought to enhance their applicable knowledge and skills. Many have gone on to pursue successful careers in large accelerator laboratories such as CERN, in industry or in universities.

In 1996 I myself attended JUAS as part of my postgraduate studies in Grenoble. The school was an outstanding springboard for my career in particle accelerators at CERN. I owe JUAS a lot and take on the role of Director with pride and a firm commitment to ensuring JUAS offers young physicists and engineers a comprehensive and up-to-date introduction to the discipline.

I encourage all those wishing to embark on a career in the fascinating field of particle accelerators to apply. You will find all practical details in the following pages.

Dr. Elias MÉTRAL

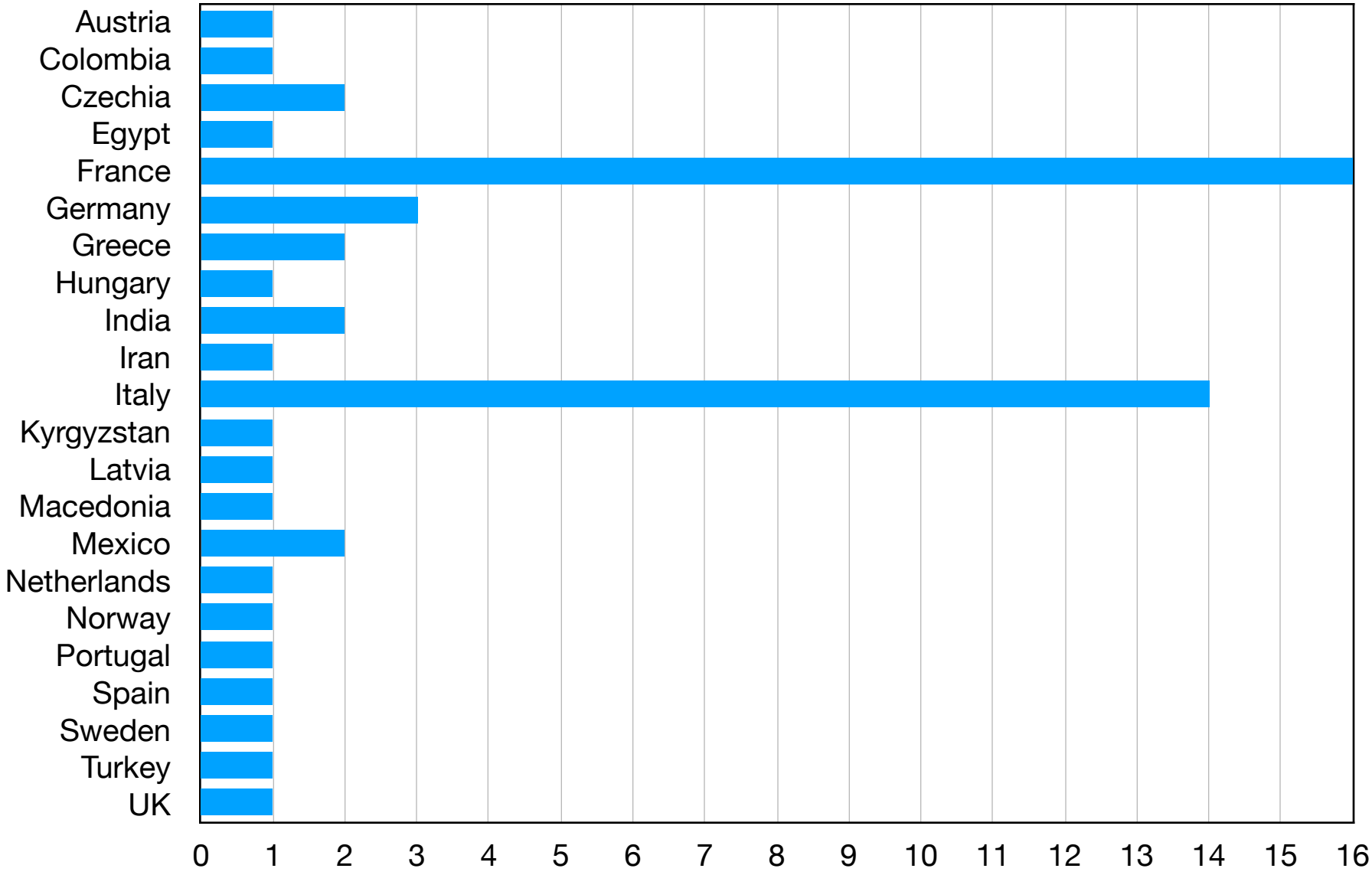
Senior accelerator physicist at CERN Beams Dept

Continuing the work undertaken by previous JUAS directors : Marcelle Rey-Campagnolle (1994–2000), Joël Le Duff (2001–2005), François Méot (2006–2010), Louis Rinolfi (2011–2016), Philippe Lebrun (2017–2020) and John Jowett (2021)

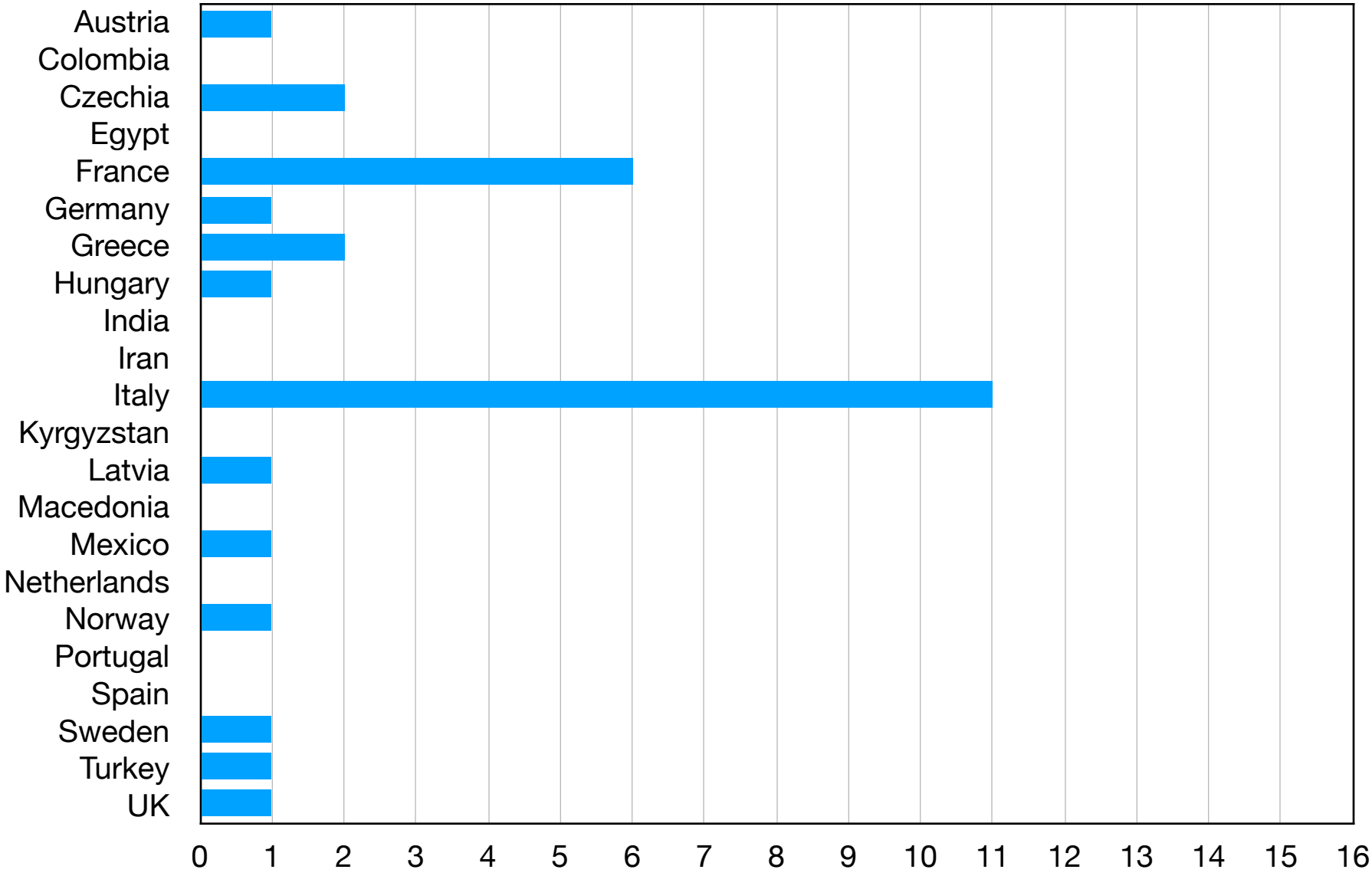
https://www.esi-archamps.eu/juas-presentation/

More on you: the JUAS-2023 students

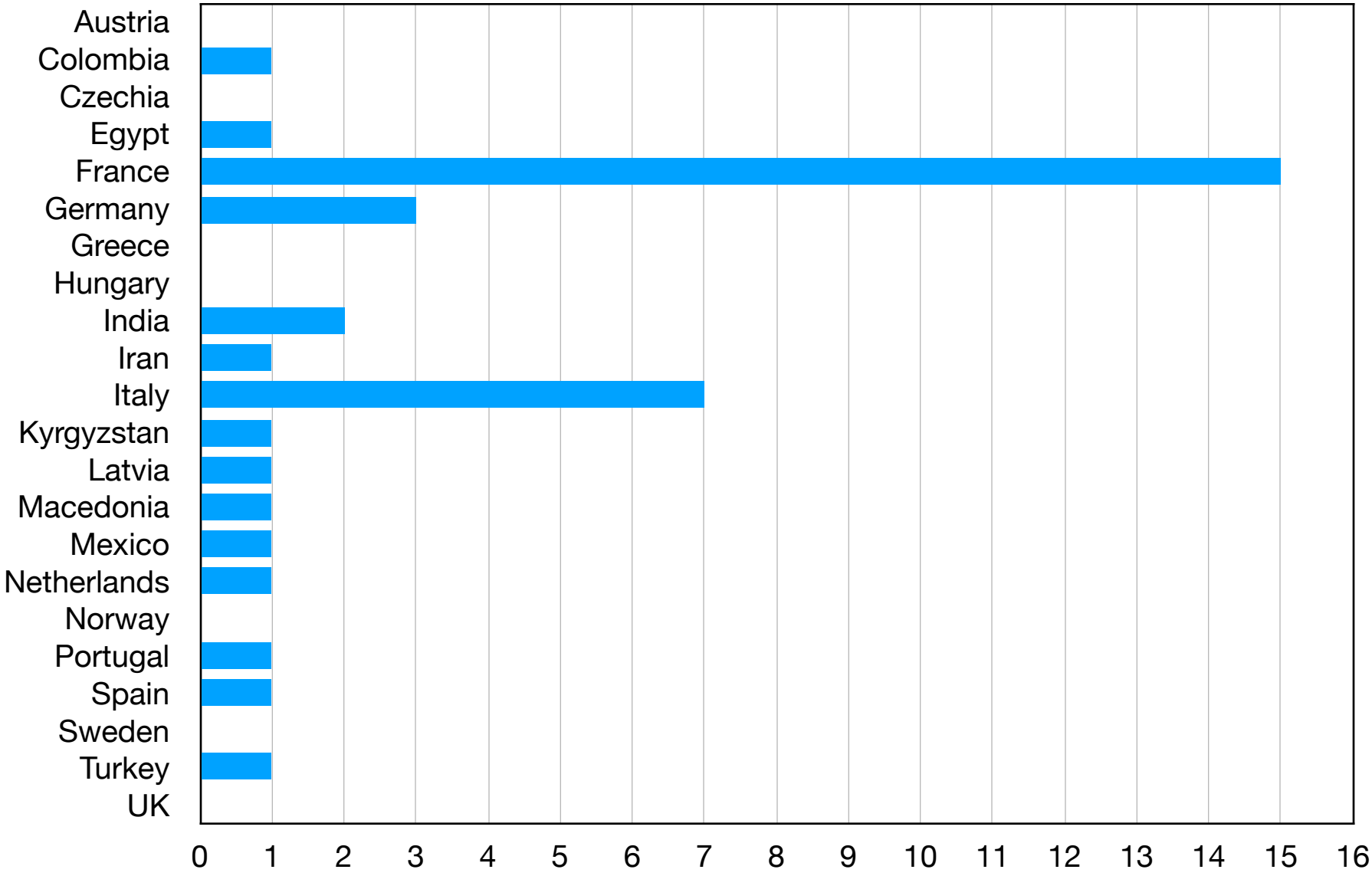
Citizenship: both courses 1&2



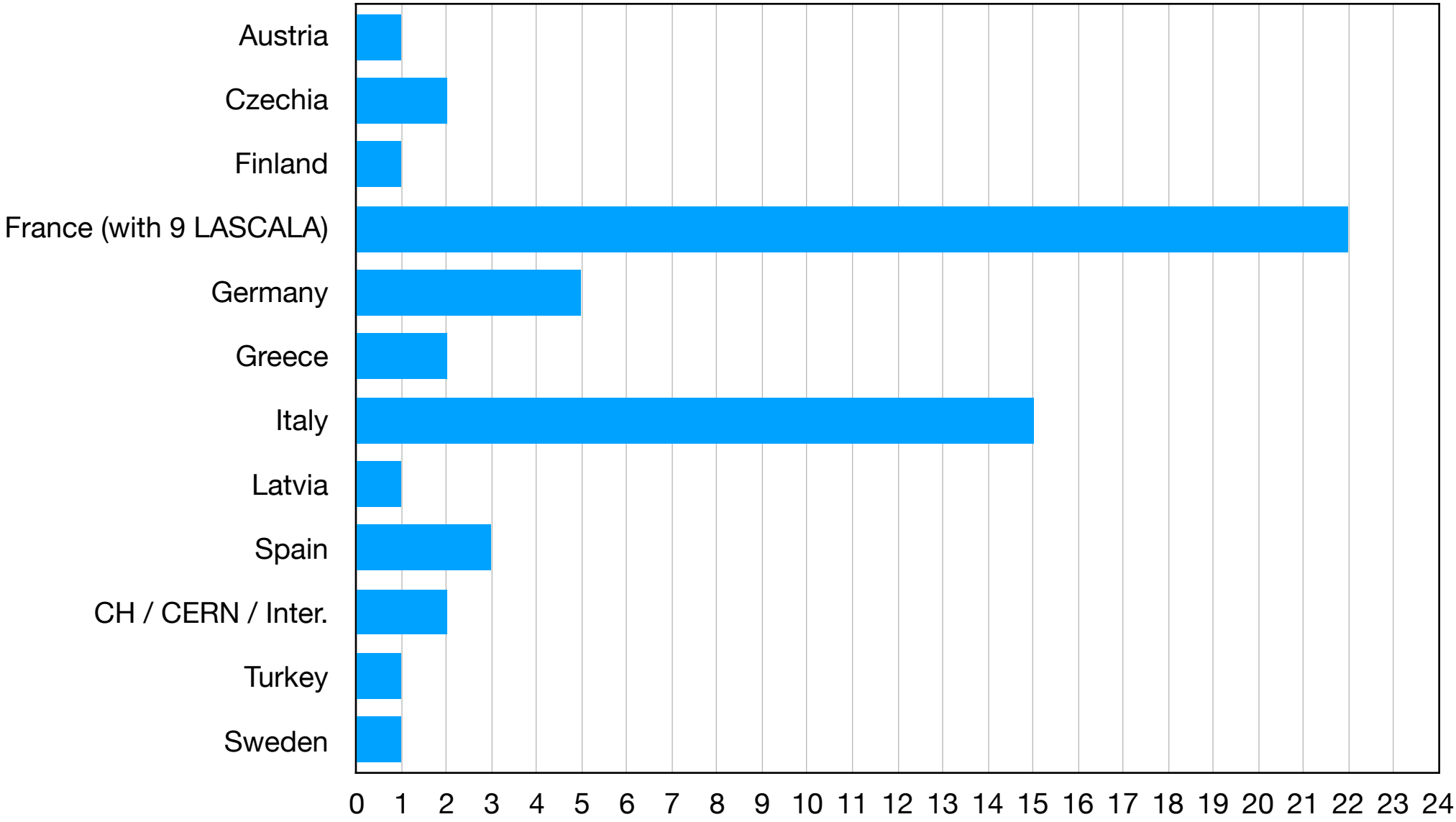
Citizenship: course 1



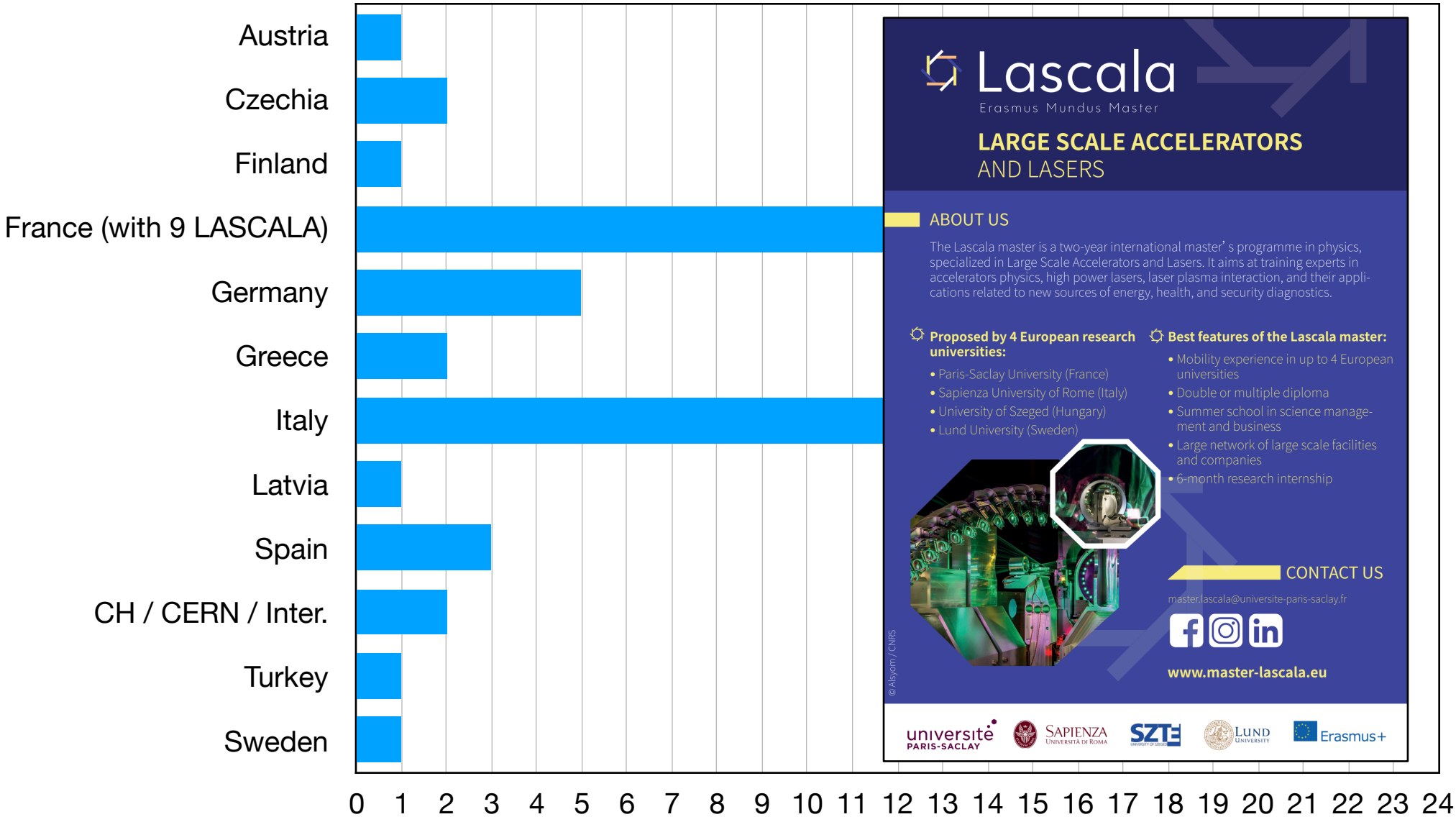
Citizenship: course 2



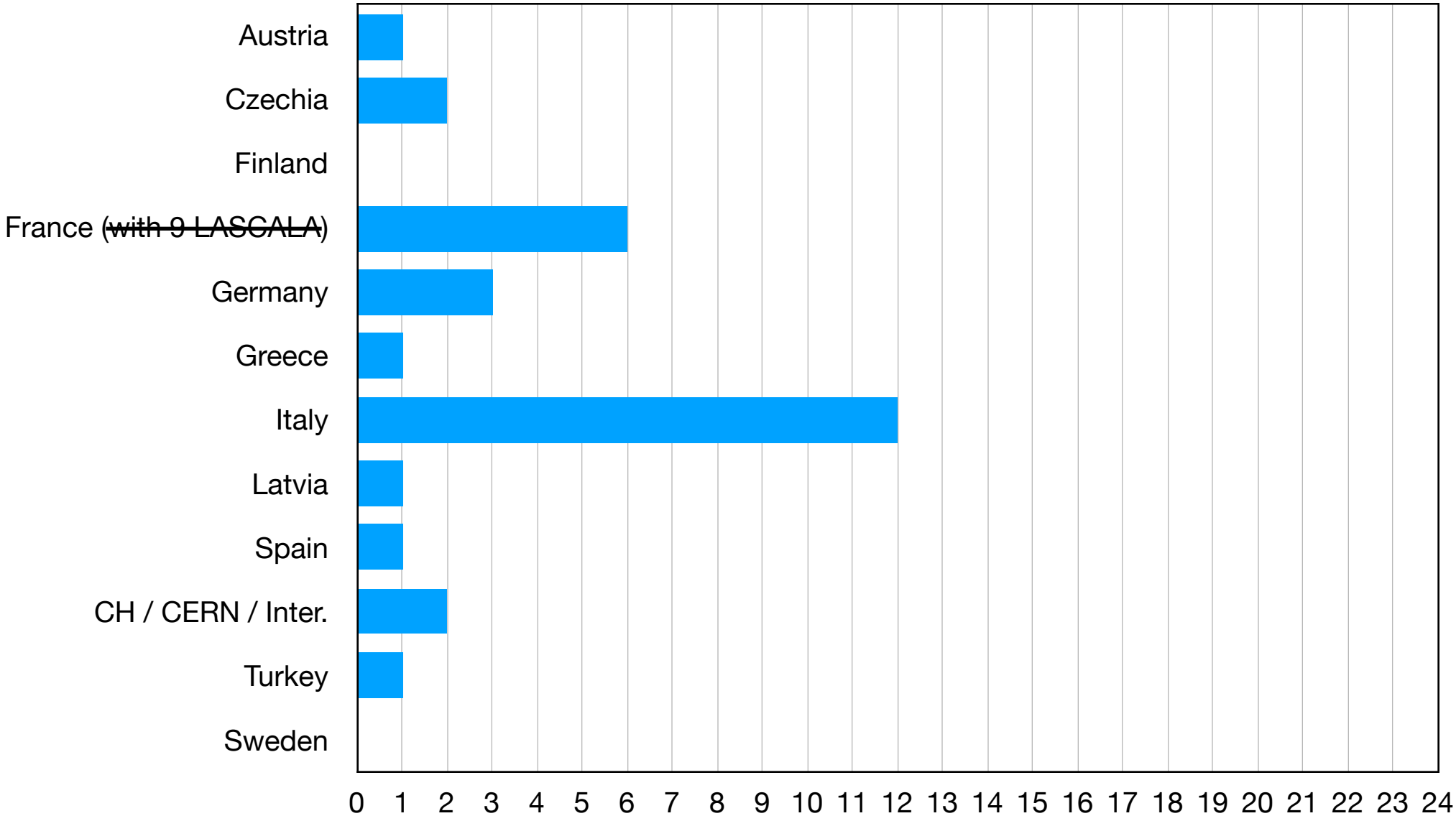
Institutions: both courses 1&2



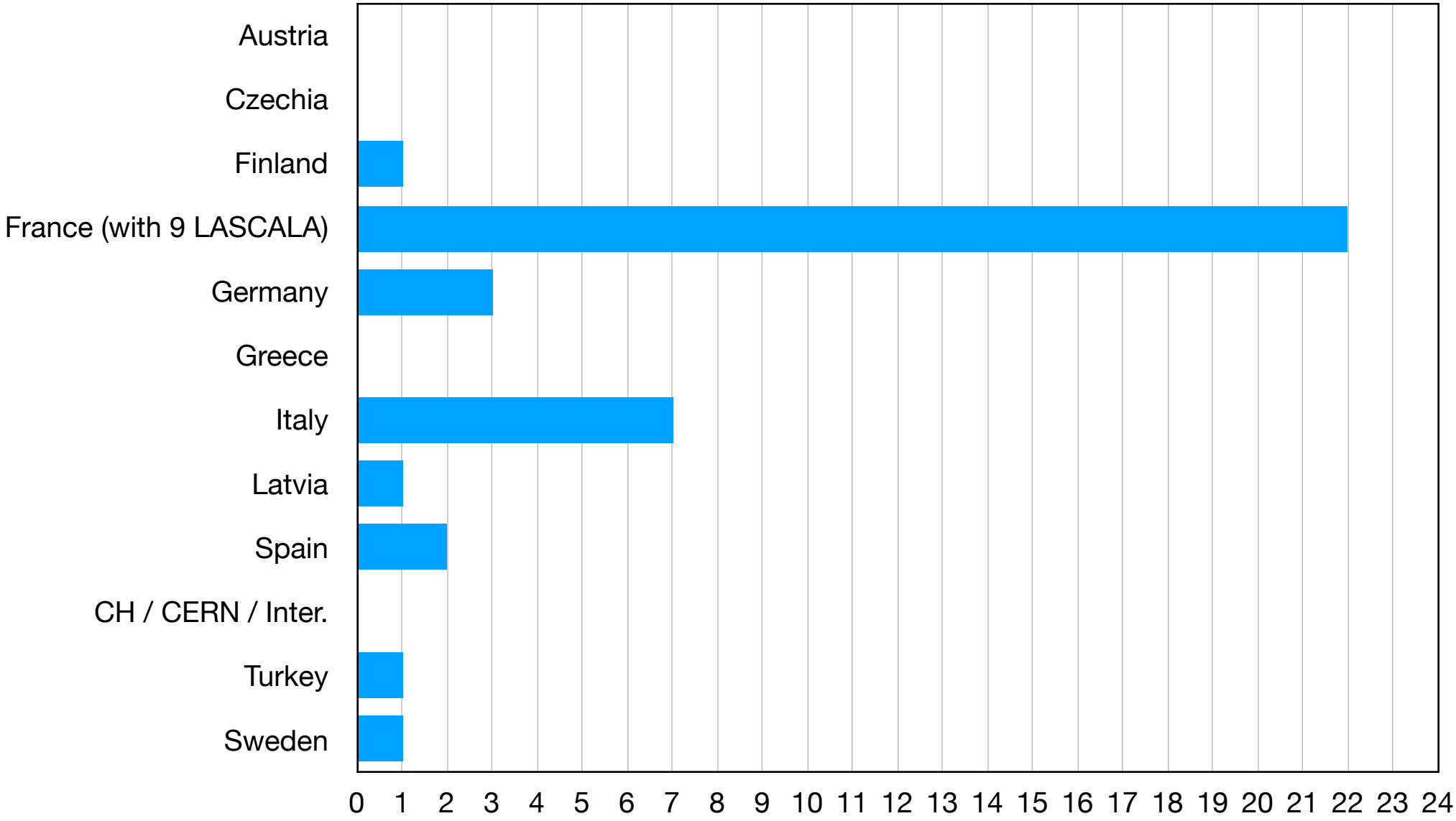
Institutions: both courses 1&2



Institutions: course 1

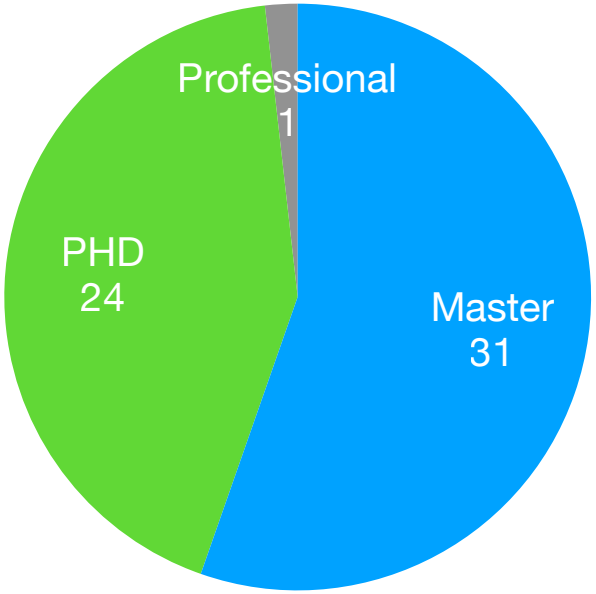


Institutions: course 2

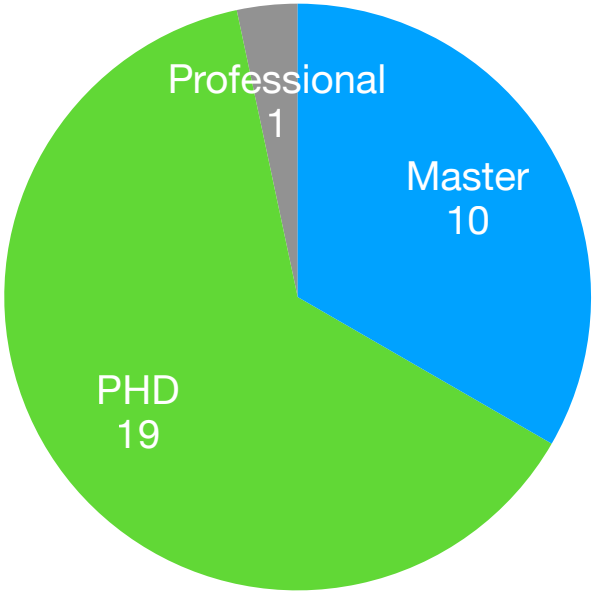


Distribution of people

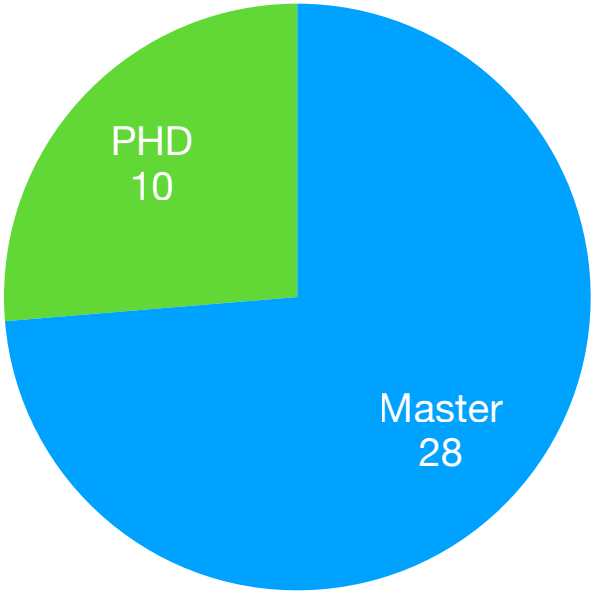
Courses 1&2



Course 1

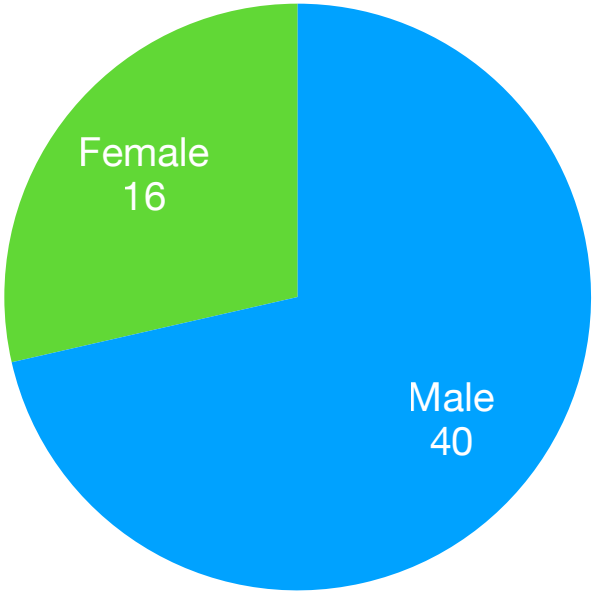


Course 2

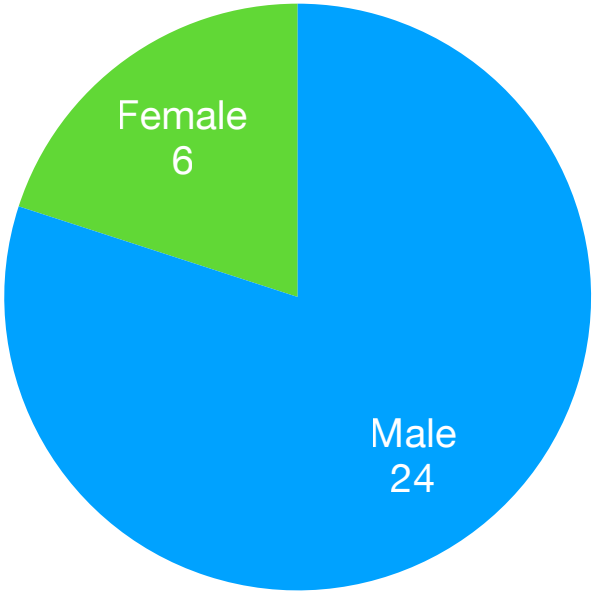


Distribution of gender

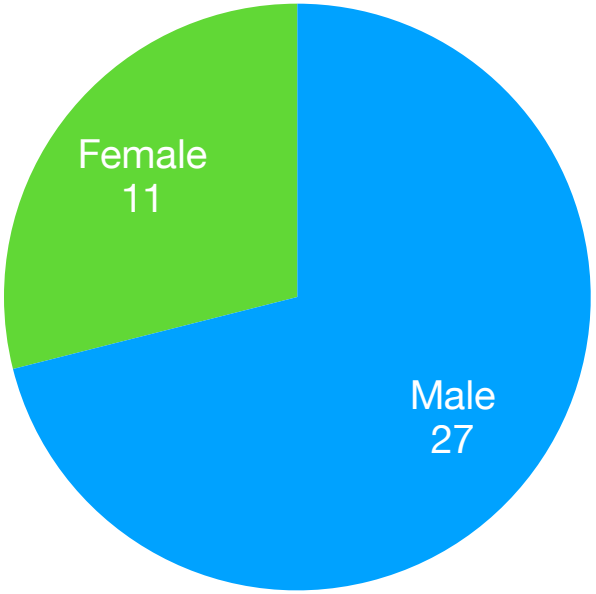
Courses 1&2



Course 1

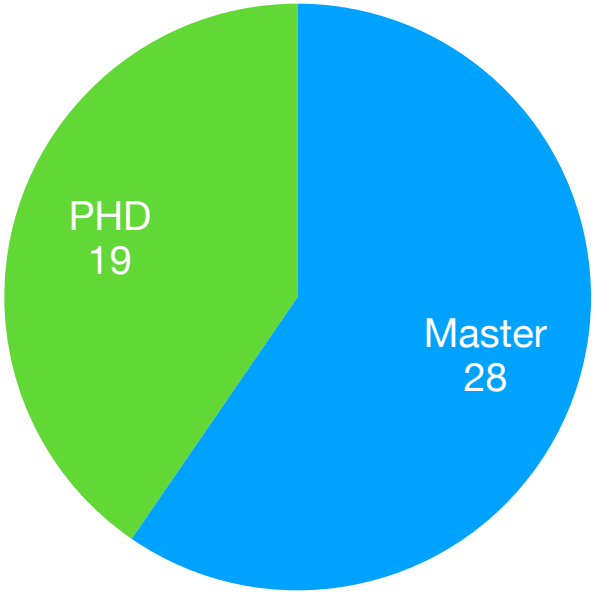


Course 2

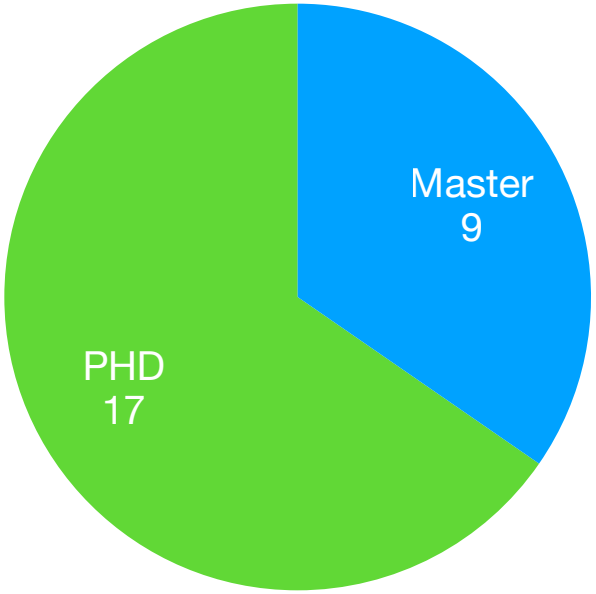


Distribution of people having exams

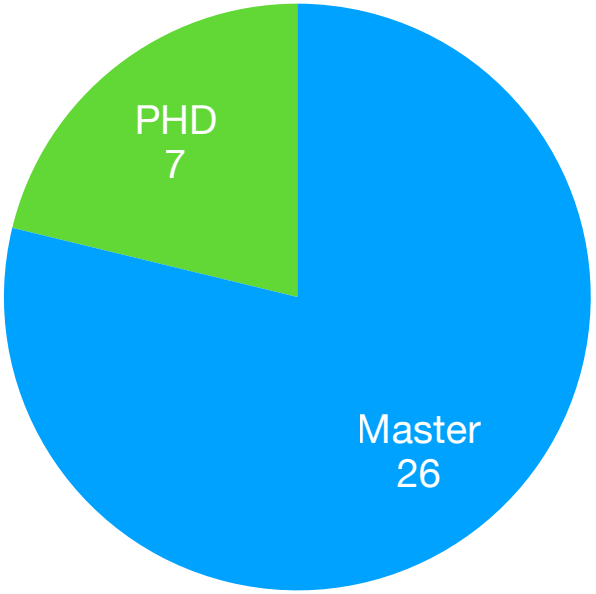
Courses 1&2



Course 1



Course 2



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  - **Special Relativity (SR)**
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- Some **MOOCs** have been also provided with **2 mandatory quizzes on EM and SR** => To be discussed this afternoon

JUAS approach to teaching accelerator physics and technology

- 2 courses, each 5 weeks
  - The science of particle accelerators
  - The technology and applications of particle accelerators

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- Written examinations (and reports)

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- Unfortunately, we were obliged to adapt to the remote format in 2021 and 2022 (due to the pandemic) but fortunately we are back to ESI this year ;-)

Scientific programme
Course 1: 110h05min

NOTE: 1 slot of 1 hour = 50 minutes lecture + 10 minutes break

(on average!)

Lectures

Topics	Nbr of hour(s)
Reminder on Special relativity & Electromagnetism	1h15
Transverse Beam Dynamics	11h40
Longitudinal Beam Dynamics	11h40
MADX	50 min
PyHeadTail	50 min
Linacs	6h40
Transverse Linear Imperfections	6h40
Cyclotrons & FFAs	5h00
Synchrotron Radiation	10h00
Transverse non-linear effects	4h10
Injection / Extraction	2h30
Accelerator Design	4h10
Collective effects (Space charge and instabilities)	10h00
TOTAL	**75h25**

Visits

Topics	Nbr of hour(s)
CERN LEIR Accelerator	1h00
ALICE Experiment at the CERN LHC	2h00
ESRF	3h00
TOTAL	**6h00**

Seminars

Topics	Nbr of hour(s)
Particle Accelerators in the 21st century	50 min
Introduction to CERN & its Accelerator Complex	50 min
Introduction on colliders session	50 min
Collider's session	4h30
Transverse non-linear manipulations	50 min
Free-Electron Lasers	50 min
Beam-based impedance measurements	50 min
Novel High Gradient Particle Accelerators	50 min
CERN LIU Project: Beam Dynamics aspects & solutions	50 min
I-FAST-CBI: Challenge based innovation for particle accelerators & related technologies	50 min
TOTAL	**12h00**

Workshops

Topics	Nbr of hour(s)
MADX	5h00
PyHeadTail	2h30
Accelerator Design	9h10
TOTAL	**16h40**

Scientific programme
Course 2: 112h45min

NOTE: 1 slot of 1 hour = 50 minutes lecture + 10 minutes break

(on average!)

Lectures

Topics	Nbr of hour(s)
Introduction to CERN practical days	1h15
Introduction to RF	3h20
Normal Conducting Magnets	5h50
RF engineering	11h40
Superconductivity (intro): RF vs. Magnets	2h30
Cryogenics for superconducting devices	50 min
Superconducting RF Cavities	1h40
Vacuum systems	8h20
Superconducting magnets	6h40
Beam instrumentation	11h40
Particle Sources	5h00
High Power Proton Linacs	2h30
Radiation safety	2h30
Low energy accelerators	2h30
Survey and Alignment of Accelerators	2h30
Accelerator for medical & industrial applications	2h30
Life-cycle and operability of particle accelerators	2h30
PSI Accelerators Controls	50 min
PSI ProScan Introduction	50 min
TOTAL	**75h25**

Seminars

Topics	Nbr of hour(s)
Particle accel., instruments of discovery in physics	50 min
Materials for SCRF cavities: Beyond niobium	50 min
Muon Colliders & associated technological challenges	50 min
Bench-impedance measurements & materials characterization	50 min
Energy recovery linacs	50 min
Accelerator driven system	50 min
Radiation Oncology: Biology, Physics & Clinical Applications	50 min
PSI: Machine learning	50 min
PSI: Dielectric laser accelerators	50 min
TOTAL	**7h30**

Visits

Topics	Nbr of hour(s)
CERN: Linac4 + AD ELENA + Thin film coating facilities	2h30
Bergoz instrumentation	3h20
Geneva Hospital	2h00
Paul Scherrer Institute (PSI)	2h30
TOTAL	**10h20**

Workshops

Topics	Nbr of hour(s)
CERN Practical days	12h00
Normal Conducting Magnets	7h30
TOTAL	**19h30**

Visits


CERN Control Room in 2020
CERN
LHC

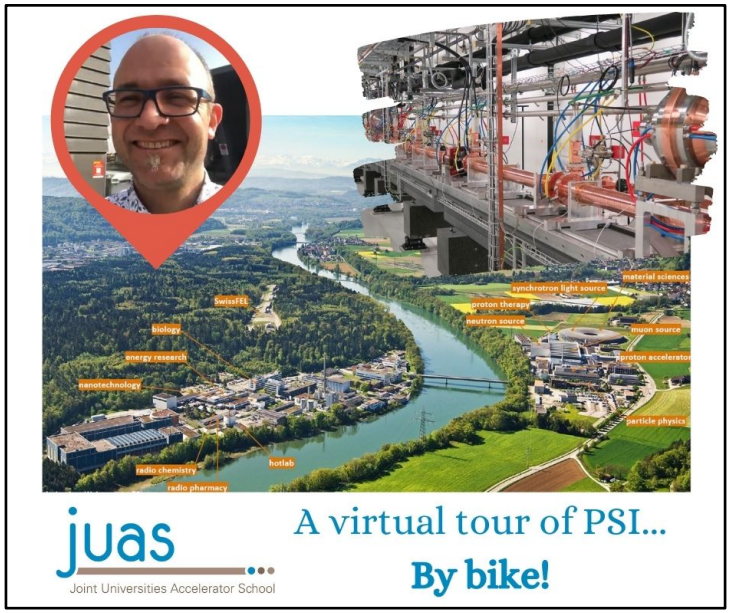

ESRF (Grenoble) in 2020
WHAT ARE X-RAYS?
ACCELERATORS AND X-RAY SOURCE
GIANT INNOVATION

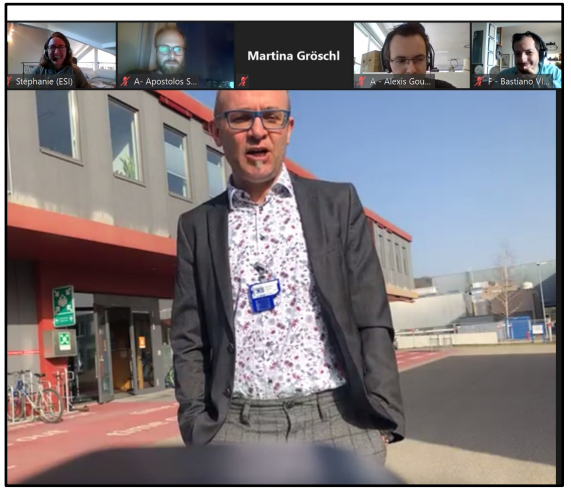
Visits

CERN Control Room in 2020

ESRF (Grenoble) in 2020

Virtual visits in 2021-22…





Accelerator Design Workshop

At ESI in 2020

Accelerator Design Workshop

At ESI in 2020

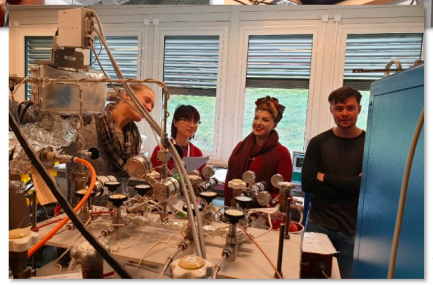
With ZOOM in 2021 and 2022 => Breakout rooms

Practical Days (Course 2)

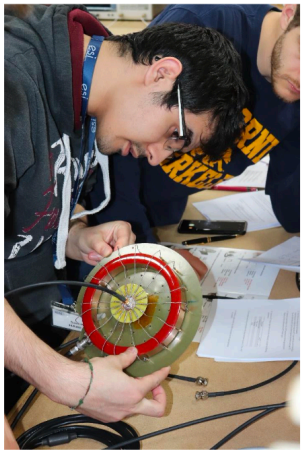
At CERN and Bergoz Instrumentation in 2020

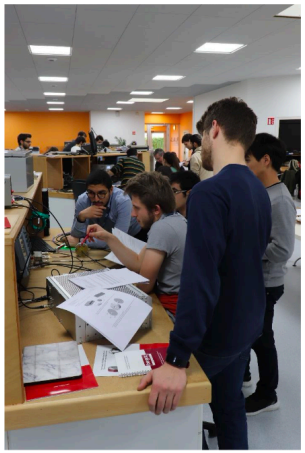
Magnet electrical tests with J. Bauche

Magnetic measurements with L. Fiscarelli



Vacuum measurements





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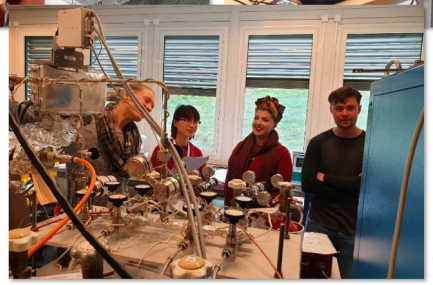

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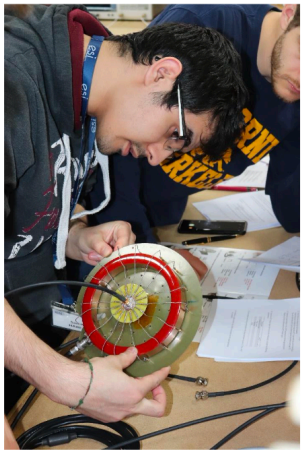
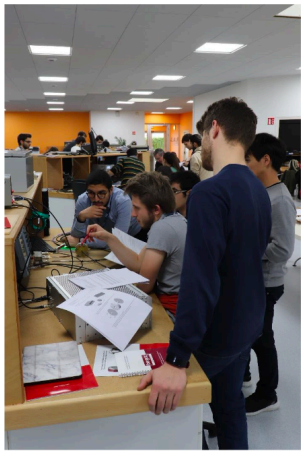
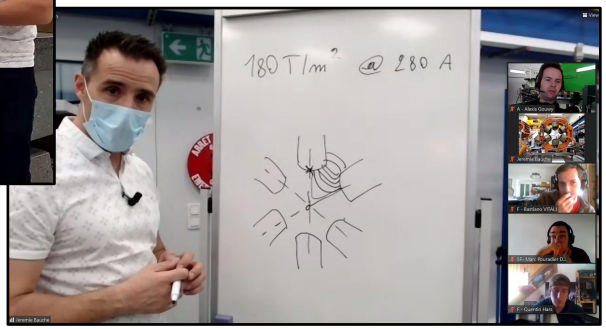
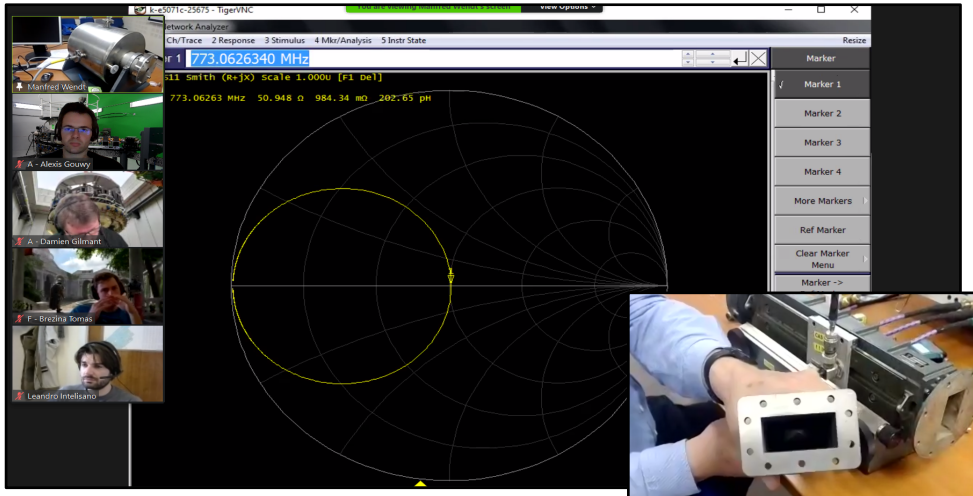




Virtual ones in 2021-22…





JUAS-2023 Course 1: WEEK 1

Monday, 9 January 2023	Tuesday, 10 January 2023	Wednesday, 11 January 2023	Thursday, 12 January 2023	Friday, 13 January 2023
	09:00 **Transverse Beam Dynamics** - Bernhard Holzer (CERN)	09:00 **Transverse Beam Dynamics** - Bernhard Holzer (CERN)	09:00 **Transverse Beam Dynamics** - Bernhard Holzer (CERN)	09:00 **Transverse Beam Dynamics** - Bernhard Holzer (CERN)
11:00 **OFFICIAL OPENING** - Robert Lionel Holland (European Scientific Institute (FR)) Stephanie Denise H Vandergooten (European Scientific Institute (FR)) Elias Metral (CERN)	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**
12:45 **WELCOME LUNCH (provided by ESI)**	13:30 **Longitudinal Beam Dynamics** - Alexandre Lasheen (CERN)	13:30 **Longitudinal Beam Dynamics** - Alexandre Lasheen (CERN)	13:30 **Longitudinal Beam Dynamics** - Alexandre Lasheen (CERN)	13:30 **Longitudinal Beam Dynamics** - Alexandre Lasheen (CERN)
14:00 **Special relativity, electromagnetism, classical and quantum mechanics** - Elias Metral (CERN)				16:30 **EVALUATION WEEK #1**
15:45 **Particle Accelerators in the 21st century** - Maurizio Vretenar (CERN)				
17:00 **CHECK-IN AT THE RESIDENCE & SHOPPING FOR GROCERIES**	16:45 **Introduction to CERN & its Accelerator Complex** - Reyes Alemany Fernandez (CERN)			

N.B.: (Small) updates to the programme remain possible at any time => Please note and regularly check the INDICO page (Course 1): https://indico.cern.ch/event/1210739/timetable/#20230109

JUAS-2023 Course 1: WEEK 2

Monday, 16 January 2023	Tuesday, 17 January 2023	Wednesday, 18 January 2023	Thursday, 19 January 2023	Friday, 20 January 2023
09:00 **Introduction to MAD-X** - Nuria Fuster Martinez	09:00 **Introduction to PyHeadTail** - Benoit Salvant (CERN)	09:00 **PyHeadTail** - Benoit Salvant (CERN)	09:00 **Linacs** - David Alesini	09:00 **Linacs** - David Alesini
10:15 **Transverse Beam Dynamics** - Bernhard Holzer (CERN)	10:15 **Longitudinal Beam Dynamics** - Alexandre Lasheen (CERN)	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**
12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**	13:30 **Linacs** - David Alesini	13:30 **Transverse Linear Imperfections** - Davide Gamba (CERN)	13:30 **Transverse Linear Imperfections** - Davide Gamba (CERN)
13:30 **MAD-X** - Nuria Fuster Martinez	13:30 **MAD-X** - Nuria Fuster Martinez	15:45 **Transverse Linear Imperfections** - Davide Gamba (CERN)		16:30 **EVALUATION FORM - Week #2**
		18:00 **AFTER WORK (dinner) provided by ESI**		

N.B.: (Small) updates to the programme remain possible at any time => Please note and regularly check the INDICO page (Course 1): https://indico.cern.ch/event/1210739/timetable/#20230109

JUAS-2023 Course 1: WEEK 3

Monday, 23 January 2023	Tuesday, 24 January 2023	Wednesday, 25 January 2023	Thursday, 26 January 2023	Friday, 27 January 2023
09:00 **Written EXAM: Transverse Beam Dynamics**	09:00 **Cyclotrons & FFAs** - bertrand jacquot	09:00 **Synchrotron Radiation** - Rasmus Ischebeck (Paul Scherrer Institut)	09:00 **Synchrotron Radiation** - Rasmus Ischebeck (Paul Scherrer Institut)	09:00 **Synchrotron Radiation** - Rasmus Ischebeck (Paul Scherrer Institut)
10:30 **BREAK**				11:00 **Synchrotron Radiation** - Rasmus Ischebeck (Paul Scherrer Institut)
11:00 **Written exam: Longitudinal Beam Dynamics**	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**
12:30 **LUNCH BREAK**	13:30 **LHC & HL-LHC**	13:30 **Synchrotron Radiation** - Rasmus Ischebeck (Paul Scherrer Institut)	13:30 **Synchrotron Radiation** - Rasmus Ischebeck (Paul Scherrer Institut)	13:30 **Synchrotron Radiation** - Rasmus Ischebeck (Paul Scherrer Institut)
13:30 **Bus transfer ESI - CERN**	14:00 **Nuclear collisions at the LHC**	14:45 **Cyclotrons & FFAs** - bertrand jacquot	14:45 **Transverse nonlinear effects** - Hannes Bartosik (CERN)	14:45 **Transverse nonlinear effects** - Hannes Bartosik (CERN)
14:00 **VISIT (CERN): Introductory presentation on ...**	14:30 **FCC-hh**			17:00 **Transverse nonlinear manipulations** - Massimo Giovannozzi (CERN)
14:30 **VISIT (CERN): ALICE exhibition & Experiment (at the CERN LHC)** - John Jowett (GSI - Helmholtzzentrum fur Schwerionenforschung GmbH (DE))	15:00 **Electron-positron circular colliders**			18:00 **EVALUATION FORM - Week #3**
16:15 **Bus transfer to CERN Meyrin Site**	15:30 **BREAK**			
16:45 **VISIT (CERN): CERN LEIR Accelerator** - Nicolo Biancacci (CERN)	16:00 **The US Electron-Ion collider (speaker connected remotely)**			
18:00 **Introduction on colliders session** - Elias Metral (CERN)	16:30 **Future high-energy linear colliders**			
19:15 **DINNER at CERN**	17:00 **Muon collider**			
20:30 **Bus transfer CERN - ESI**				

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JUAS-2023 Course 1: WEEK 4

Monday, 30 January 2023	Tuesday, 31 January 2023	Wednesday, 1 February 2023	Thursday, 2 February 2023	Friday, 3 February 2023
09:00 **Injection / Extraction** - Nicola Carmignani (ESRF)	09:00 **Accelerator design** - Bastian Haerer	09:00 **Collective effects** - Mauro Migliorati (Sapienza Universita e INFN, Roma I (IT))	09:00 **Collective effects** - Mauro Migliorati (Sapienza Universita e INFN, Roma I (IT))	09:00 **Collective effects** - Mauro Migliorati (Sapienza Universita e INFN, Roma I (IT))
	11:00 **Accelerator design** - Adrian Oeftiger (GSI)			
12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**
13:30 **Free-Electron Lasers** - Eduard Prat Costa	13:30 **Accelerator design** - Adrian Oeftiger (GSI)	13:30 **Collective effects** - Mauro Migliorati (Sapienza Universita e INFN, Roma I (IT))	13:30 **Collective effects** - Mauro Migliorati (Sapienza Universita e INFN, Roma I (IT))	13:30 **Collective effects** - Mauro Migliorati (Sapienza Universita e INFN, Roma I (IT))
14:45 **Accelerator design** - Bastian Haerer		14:45 **Beam-based impedance measurements** - Nicolo Biancacci (CERN)	14:45 **Novel High Gradient Particle Accelerators** - Ralph Wolfgang Assmann (Deutsches Elektronen-Synchrotron (DE))	14:45 **CERN LIU Project: Beam dynamics aspects & solutions** - Giovanni Rumolo (CERN)
		16:00 **Accelerator design** - Adrian Oeftiger (GSI)	16:00 **Accelerator design** - Adrian Oeftiger (GSI)	16:00 **Accelerator design** - Adrian Oeftiger (GSI)
	18:00 **AFTER WORK (dinner) provided by ESI**			18:00 **EVALUATION FORM - Week #4**

N.B.: (Small) updates to the programme remain possible at any time => Please note and regularly check the INDICO page (Course 1): https://indico.cern.ch/event/1210739/timetable/#20230109

JUAS-2023 Course 1: WEEK 5

Monday, 6 February 2023	
09:00	PRIVATE STUDIES
12:00	LUNCH BREAK
13:30	Oral EXAM: Accelerator design (by group)

Tuesday, 7 February 2023	
09:00	PRIVATE STUDIES
12:00	LUNCH BREAK
13:30	Written EXAM: Synchrotron radiation

Wednesday, 8 February 2023	
09:00	PRIVATE STUDIES
10:30	Written EXAM: Subject #4 TBC
12:00	LUNCH BREAK
13:30	PRIVATE STUDIES
15:00	Written EXAM: Subject #5 TBC

Thursday, 9 February 2023	
09:00	**Visit (ESRF)** - Jean-luc Revol

Friday, 10 February 2023	
09:00	CHECK-OUT AT THE RESIDENCE
10:00	**I-FAST-CBI: Challenge based innovation for particle accelerators & related technologies**
11:00	**Closing session (Course 1)** - Stephanie Denise H Vandergooten (European Scientific Institute (FR)) Elias Metral (CERN)
12:00	EVALUATION FORM - Week #5
12:30	Goodbye lunch (provided by ESI)

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JUAS-2023 Course 2: WEEK 1

Monday, 13 February 2023	Tuesday, 14 February 2023	Wednesday, 15 February 2023	Thursday, 16 February 2023	Friday, 17 February 2023
	09:00 **Introduction to RF** - Andrea Mostacci (Sapienza University of Rome e INFN-Roma I (IT))	09:00 **Introduction to RF** - Andrea Mostacci (Sapienza University of Rome e INFN-Roma I (IT))	09:00 **RF Engineering** - Manfred Wendt (CERN) Christine Vollinger (CERN)	09:00 **RF Engineering** - Christine Vollinger (CERN) Manfred Wendt (CERN)
11:00 **OFFICIAL OPENING** - Stephanie Denise H Vandergooten (European Scientific Institute (FR)) Elias Metral (CERN) Robert Lionel Holland (European Scientific Institute (FR))	12:00 **LUNCH BREAK**	10:15 **RF Engineering** - Manfred Wendt (CERN) Christine Vollinger (CERN)	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**
12:30 **WELCOME LUNCH (provided by ESI)**	13:30 **Normal Conducting Magnets - INTRODUCTION** - Thomas Zickler (CERN)	12:15 **LUNCH BREAK**	13:30 **Normal Conducting Magnets - CASE STUDY INTRODUCTION** - Thomas Zickler (CERN)	13:30 **Normal Conducting Magnets - CASE STUDY #2** - Thomas Zickler (CERN)
14:00 **Particle accelerators, instruments of discovery in physics** - Philippe Lebrun (European Scientific Institute (FR))	14:30 **Normal Conducting Magnets - BASIC PRINCIPLES** - Thomas Zickler (CERN)	13:30 **Normal Conducting Magnets - MAGNET CONSTRUCTION** - Thomas Zickler (CERN)	14:30 **Normal Conducting Magnets - CASE STUDY #1** - Thomas Zickler (CERN)	14:30 **Normal Conducting Magnets - CASE STUDY #3** - Thomas Zickler (CERN)
15:15 **Introduction to CERN practical days (scheduled on 6 & 7 March)**	15:30 **Normal Conducting Magnets - MAGNET TYPES** - Thomas Zickler (CERN)	14:30 **Normal Conducting Magnets - ANALYTICAL DESIGN** - Thomas Zickler (CERN)		15:30 **Normal Conducting Magnets - CASE STUDY #4** - Thomas Zickler (CERN)
16:30 **CHECK-IN AT THE RESIDENCE & SHOPPING FOR GROCERIES**		15:30 **Normal Conducting Magnets - NUMERICAL DESIGN** - Thomas Zickler (CERN)		

N.B.: (Small) updates to the programme remain possible at any time => Please note and regularly check the INDICO page (Course 2): https://indico.cern.ch/event/1214547/timetable/#20230213

JUAS-2023 Course 2: WEEK 2

Monday, 20 February 2023	Tuesday, 21 February 2023	Wednesday, 22 February 2023	Thursday, 23 February 2023	Friday, 24 February 2023
09:00 **RF Engineering** - Manfred Wendt (CERN) Christine Vollinger (CERN)	09:00 **RF Engineering** - Manfred Wendt (CERN) Christine Vollinger (CERN)	09:00 **Superconducting RF cavities** - Fritz Caspers (European Scientific Institute (FR))	09:00 **Vacuum systems** - Vincent Baglin (CERN) Roberto Kersevan (CERN)	09:00 **Vacuum systems** - Roberto Kersevan (CERN) Vincent Baglin (CERN)
	10:00 **RF Engineering** - Manfred Wendt (CERN) Christine Vollinger (CERN)	11:15 **Materials for SCRF cavities: Beyond niobium** - Sergio Calatroni (CERN)		
12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**	12:15 **LUNCH BREAK**	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**
13:30 **Normal Conducting Magnets - CASE STUDY - Oral presentation** - Thomas Zickler (CERN)	13:30 **Superconductivity (intro): RF vs Magnets** - Claire Antoine (CEA)	13:30 **Vacuum systems** - Roberto Kersevan (CERN) Vincent Baglin (CERN)	13:30 **Superconducting magnets** - Paolo Ferracin	13:30 **Superconducting magnets** - Paolo Ferracin
15:30 **Normal Conducting Magnets - TUTORIAL** - Thomas Zickler (CERN)	16:45 **Cryogenics for superconducting devices** - Philippe Lebrun (European Scientific Institute (FR))			16:30 **Superconducting magnets** - Paolo Ferracin
	18:00 **AFTER WORK (dinner) provided by ESI**			

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JUAS-2023 Course 2: WEEK 3

Monday, 27 February 2023	Tuesday, 28 February 2023	Wednesday, 1 March 2023	Thursday, 2 March 2023	Friday, 3 March 2023
09:00 **Written EXAM: RF Engineering**	09:00 **Beam instrumentation** - Peter Forck	09:00 **Beam instrumentation** - Peter Forck	09:00 **Beam instrumentation** - Peter Forck	09:00 **Beam instrumentation** - Peter Forck
10:30 **BREAK**	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**
11:00 **Written exam: NC + SC Magnets**	13:30 **Particles sources** - Thomas THUILLIER	13:30 **Bench-impedance measurements & materials characterization** - Nicolo Biancacci (CERN)	13:30 **Bus transfer ESI - BERGOZ**	13:30 **Beam instrumentation** - Peter Forck
12:30 **LUNCH BREAK**	16:45 **Muon colliders & associated technological challenges** - Daniel Schulte (CERN)	14:45 **Particles sources** - Thomas THUILLIER	14:15 **VISIT (BERGOZ)** - Etienne TOUZAIN	15:45 **Energy recovery linacs** - Michaela Arnold
13:30 **Bus transfer ESI - CERN**			17:15 **Bus transfer BERGOZ - ESI**	
14:30 **VISIT (CERN): LINAC4** - Alessandra Lombardi (CERN) Jean-Baptiste Lallement (CERN)				
15:45 **VISIT (CERN): AD ELENA** - Christian Carli (CERN)				
17:00 **Visit (CERN): THIN FILM COATING FACILITIES** - Wilhelmus Vollenberg (CERN) Pedro Costa Pinto (CERN)				
18:30 **DINNER at CERN**				
19:30 **Bus transfer CERN - ESI**				

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JUAS-2023 Course 2: WEEK 4

Monday, 6 March 2023	Tuesday, 7 March 2023	Wednesday, 8 March 2023	Thursday, 9 March 2023	Friday, 10 March 2023
08:15 **Bus transfer ESI - CERN**	08:15 **Bus transfer ESI - CERN**			
09:00 **CERN Practical days**	09:00 **CERN Practical days**	09:00 **High Power Proton Linacs** - Mohammad Eshraqi (ESS - European Spallation Source (SE))	09:00 **Low Energy Accelerators** - wim mondelaers (EC-JRC-IRMM)	09:00 **Acc. for medical & industrial applications** - Erik Van Der Kraaij (IBA - Ion Beam Applications) jerome Mandrillon
12:00 **LUNCH (provided by CERN)**	12:00 **LUNCH (provided by CERN)**	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**	12:00 **LUNCH BREAK**
13:30 **CERN Practical days**	13:30 **CERN Practical days**	13:30 **Radiation safety** - Xavier Queralt	13:30 **Survey and Alignment of Accelerators** - Jean-Christophe Gayde (CERN)	13:30 **Life-cycle and operability of particle accelerators** - Samuel Meyroneinc
16:30 **Bus transfer CERN - ESI**	16:30 **Bus transfer CERN - ESI**	16:45 **Accelerator driven system** - Frédéric BOULY		

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JUAS-2023 Course 2: WEEK 5

Monday, 13 March 2023		Tuesday, 14 March 2023		Wednesday, 15 March 2023		Thursday, 16 March 2023		Friday, 17 March 2023	
09:00	**Oral EXAM: Practical days @CERN**	09:00	**PRIVATE STUDIES**	09:00	**PRIVATE STUDIES**	09:00	**Visit (PSI)** - Rasmus Ischebeck (Paul Scherrer Institut)	09:00	**CHECK-OUT AT THE RESIDENCE**
12:00	**LUNCH BREAK**	10:30	**Written EXAM: Beam instrumentation**	10:30	**Written EXAM: Subject #5 TBC**	11:00	**PSI: Accelerator Controls** - Elke Zimoch (PSI)	11:00	**Closing session (Course 2)** - Elias Metral (CERN) Stephanie Denise H Vandergooten (European Scientific Institute (FR))
13:30	**Bus transfer ESI - Geneva Hospital**	12:00	**LUNCH BREAK**	12:00	**LUNCH BREAK**	12:00	**LUNCH (provided by PSI)**	12:00	**Goodbye lunch (provided by ESI)**
14:15	**Visit: Geneva Hospital** - André Durham	13:30	**PRIVATE STUDIES**	13:30	**Bus transfer ESI - Paul Scherrer Institute (PSI)**	13:30	**PSI: ProScan Introduction** - Jacobus Maarten Schippers		
16:30	**Radiation Oncology: Biology, Physics & Clinical Applications** - André Durham	15:00	**Written EXAM: Subject#4 TBC**	17:30	**Visit: PSI** - Rasmus Ischebeck (Paul Scherrer Institut)	14:45	**PSI: Machine learning** - Jochem Snuverink (PSI)		
17:30	**Bus transfer Geneva Hospital - ESI**			19:30	**DINNER (provided by PSI)**	16:00	**PSI: Dielectric laser accelerators** - Benedikt Hermann		
						17:00	**Bus transfer PSI - ESI**		

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Software installation

- You should all have a CERN Computer account, which will help a lot => To be discussed with the relevant lecturer

- Recommendation for the MAD-X Workshop => See INDICO site

Topic	Lecturer	Deadline	Requirements	Guidelines
MAD-X Workshop	N. Fuster-Martínez	15 January	Windows/Linux/Mac + Browser (Firefox/Chrome...)	CLICK HERE

JUAS-2023 Examinations

Course 1: WRITTEN examination

- 5 topics, each allocated 1.5 hours
  - Transverse beam dynamics (**coefficient 14**) => Monday Week 3
  - Longitudinal beam dynamics (**coefficient 14**) => Monday Week 3
  - Synchrotron radiation (**coefficient 12**) => Tuesday Week 5
  - Remaining 2 topics will be announced in Week 4 (**coefficients similar to number of slots**) => Wednesday Week 5
- Students have access to paper or downloaded documents on computer/tablet
- WIFI and wire connections disabled in exam room
- No mobile phone or other connected electronic device allowed

JUAS-2023 Examinations

Course1: ORAL examination

- For the Accelerator Design Workshop (**coefficient 6**) => Monday Week 5
  - *Note: there will be a **bonus for those who will hand back a well filled notebook after the MAD-X Workshop***

JUAS-2023 Examinations

Course 2: WRITTEN examination

- 5 topics, each allocated 1.5 hours
  - RF engineering (**coefficient 14**) => Monday Week 3
  - NC Magnets (**coefficient 14**) => Monday Week 3 + report to be given before the exam to prepare the exam (**coefficient 3**)
  - Beam instrumentation (**coefficient 14**) => Tuesday Week 5
  - Remaining 2 topics will be announced in Week 4 (**coefficients similar to number of slots**) => Tuesday and Wednesday Week 5
- Students have access to paper or downloaded documents on computer/tablet
- WIFI and wire connections disabled in exam room
- No mobile phone or other connected electronic device allowed

JUAS-2023 Examinations

Course 2: ORAL examination

- For the Practical Days at CERN (**coefficient 6**) => Monday Week 5

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)

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- 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

Attendance Certificates & Grade Sheets: Master and Doctoral students

- If not taking the exams, they get
  - **Certificate of Attendance** with note that they have “opted not to take the examinations”

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- If taking the exams, they get
  - **Certificate of Attendance** with
    - Overall grade of student
    - Overall class average grade & standard deviation
  - **Grade Sheet** with, for each subject
    - Student grade
    - Class average grade

Attendance Certificates & Grade Sheets: Master and Doctoral students

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    - Overall grade of student
    - Overall class average grade & standard deviation
  - **Grade Sheet** with, for each subject
    - Student grade
    - Class average grade
- Class average grades are based only on results of Master and Doctoral students

Attendance Certificates & Grade Sheets: Master and Doctoral students

- If not taking the exams, they get
  - **Certificate of Attendance** with note that they have “opted not to take the examinations”
- If taking the exams, they get
  - **Certificate of Attendance** with
    - Overall grade of student
    - Overall class average grade & standard deviation
  - **Grade Sheet** with, for each subject
    - Student grade
    - Class average grade
- Class average grades are based only on results of Master and Doctoral students
- **All grades out of 20 (French system!)**

Attendance Certificates & Grade Sheets: Professional students

- All students get
  - **Certificate of Attendance**, bearing no mention of examinations

Attendance Certificates & Grade Sheets: Professional students

- All students get
  - **Certificate of Attendance**, bearing no mention of examinations
- If taking the exams, they get additionally
  - **Grade Sheet** with, for each subject, the student grade

Attendance Certificates & Grade Sheets: Professional students

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  - **Certificate of Attendance**, bearing no mention of examinations
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  - **Grade Sheet** with, for each subject, the student grade
- Grades of Professional students are not included in class averages

Attendance Certificates & Grade Sheets: Professional students

- All students get
  - **Certificate of Attendance**, bearing no mention of examinations
- If taking the exams, they get additionally
  - **Grade Sheet** with, for each subject, the student grade
- Grades of Professional students are not included in class averages
- **All grades out of 20**

JUAS-IPAC Prize 2023

We are delighted to inform applicants to JUAS 23 of the **JUAS-IPAC Prize 2023**, awarded by the IPAC Committee, in charge of organising IPAC 23, the International Particle Accelerator Conference, to be held in **Venice (Italy) on 7 - 12 May 2023**.

The Prize will take the form of a cash grant covering registration, travel, hotel and subsistence costs at IPAC 23.

The Prize will be awarded to one student attending Course 1 – Science of Particle Accelerators. He/she will be selected by the JUAS Director and recommended to the IPAC Committee according to the following criteria:

- enrolled in a Master or PhD programme
- obtaining the highest overall mark in the Course 1 examinations
- committed to pursuing his/her career in the field of particle accelerators
- willing to present his/her work (Master's thesis, doctoral research) at the Conference
- willing to assist the Conference organisers (e.g. acting as scientific secretary of a session)
- willing to promote JUAS on the stand devoted to particle accelerator schools

More information about the IPAC conference available HERE. https://www.ipac23.org/

Evaluation of all JUAS speakers (lectures, seminars, visits)

juas
Joint Universities Accelerator School

JUAS 2023 - Evaluation Form (Week #1)

In the INDICO program grid, you will find each Friday (last block) the link to the evaluation form of the speakers who gave you a lecture/seminar during the past week. Some topics are given over two weeks, so you will have to evaluate the concerned speakers at the end of their topics (the second week). **Please take 5 minutes (over the weekend) to fill them out**: This evaluation form is destined to help the teachers improve their lectures!

As it is anonymous, please answer it as sincerely as possible. Do not hesitate to leave a comment (good or less good), it is always useful.

(Another global evaluation form will be sent to all of you at the end of the Course 1 (around 10 February). This questionnaire will address specific organizational & logistical questions related to Course 1. Once again, your feedback will bring added value for next editions)

- Evaluation results are communicated
  - Individually to the lecturers
  - Statistically to the JUAS Advisory Board

Evaluation of all JUAS speakers (lectures, seminars, visits)

1) Special relativity, electromagnetism, classical & quantum mechanics (E. Métral)

(What to remember for particle accelerators)

1a) How would you rate the following aspects of the lecture ? *

(0: Did not attend or not applicable) / 1: Unsatisfactory -> 5: Highly Satisfactory

	0	1	2	3	4	5
Level of the subject	○	○	○	○	○	○
Oral presentation	○	○	○	○	○	○
Written teaching material	○	○	○	○	○	○
Exercises/tutorials (if applicable)	○	○	○	○	○	○

1b) Comments / Suggestions

Your answer

Social aspects of JUAS

- The social interactions between lectures, at breaks, lunch, after-works, journeys to lab visits, etc. are an important and valuable part of the JUAS experience
  - Making friends with people from a diversity of backgrounds
  - Learning about their experiences of other students, as well as professionals and the faculty
  - N.B.: most faculty are accelerator experts at national or international labs, not university lecturers, giving their time voluntarily

JUAS code of conduct: Mutual respect

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- Freedom of opinion and of belief

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- Cultural diversity

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- Cultural diversity
- Gender equality

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⇒ Constitution of France, Article 1

- La France… assure l'égalité devant la loi sans distinction d'origine, de race ou de religion. Elle respecte toutes les croyances
- France… shall ensure the equality before the law, without distinction of origin, race or religion. It shall respect all beliefs

Job opportunities

- Studying at JUAS is a good opportunity to find a position
  - Internship in national or international laboratory
  - Summer job
  - PhD grant
  - Post doctoral
  - …

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  - Post doctoral
  - …
- Do not hesitate to talk and ask further questions / info to any of the JUAS-2023 speakers

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  - Summer job
  - PhD grant
  - Post doctoral
  - …
- Do not hesitate to talk and ask further questions / info to any of the JUAS-2023 speakers
- Consult our job opportunity web site: https://www.esi-archamps.eu/juas-presentation/

Career opportunities

https://www.esi-archamps.eu/juas-presentation/

Keywords | Location

Remote positions only

Search Jobs

Fixed-term | Internship | Permanent | PhD position

Search completed. Found 13 matching records. RSS Reset

Postdoctoral Research Associate In Accelerator Science – AWAKE **The University of Liverpool**	Liverpool (UK)	**Fixed-term** Posted on 9 December 2022
Postdoctoral Research Associate In Accelerator Science – Aegis **The University of Liverpool**	Liverpool (UK)	**Fixed-term** Posted on 9 December 2022
PostDoc Research Position: A detector for electron-hadron scattering at the LHC **AGH University of Science and Technology, Kraków (Poland)** The experimental High Energy Physics group at the AGH UST has a long tradition of top research in HEP and now is involved in the Atlas and LHCb experiments at CERN	Meyrin (Switzerland)	**Fixed-term** Posted on 9 December 2022
Accelerator Physicist **CERN**	Meyrin (Switzerland)	**Fixed-term** Posted on 7 November 2022
RF Development Engineer **AIMA DEVELOPPEMENT** Many years of experience have enabled AIMA DEVELOPPEMENT to build up extensive expertise in the field of cyclotron innovative designs for medical and industrial applications.	Nice (France)	**Permanent** Posted on 21 October 2022
Staff Scientist I / II (PhD and 5+ years postdoc) **Jefferson Lab**	Newport News, Virginia (USA)	**Fixed-term** Posted on 21 October 2022
Staff Scientist I (PhD and 2+ years postdoc) **Jefferson Lab**	Newport News, Virginia (USA)	**Fixed-term** Posted on 21 October 2022
Job opportunities at ALBA **ALBA Synchrotron**	Barcelona (Spain)	**Permanent** Posted on 26 September 2022
Post Doctoral position : Beam dynamics **SOLEIL**	Saint-Aubin (France)	**Fixed-term** Posted on 26 September 2022
Physicist Staff Scientist **Lawrence Berkeley National Laboratory (LBNL)**	Berkeley, California (USA)	**Permanent** Posted on 27 June 2022
Physicist Research Scientist **Lawrence Berkeley National Laboratory (LBNL)**	Berkeley, California (USA)	**Fixed-term** Posted on 27 June 2022
Post-doc fellow at INFN-LNF **INFN-LNF**	Frascati, Rome (Italy)	**Fixed-term** Posted on 27 June 2022
Doctoral student programme **CERN**	Meyrin (Switzerland)	**PhD position** Posted on 25 June 2022

2nd EU-funded challenge in 2023

=> See more info also during the seminar from N. Delerue on Friday 10/02/23

Welcome to JUAS-2023 and enjoy!

=> We hope that you will have a rewarding experience and get a good start in learning the fascinating physics of particle accelerators