



The CERN Accelerator School

# Basics of Accelerator Physics and Technology

9-13 May 2022

Appart'City, Ferney Voltaire, France

# WELCOME!

# The CERN Accelerator School - CAS

- Established at the beginning of 1983
  - To preserve and transmit knowledge accumulated, at CERN and elsewhere, on particle accelerators and colliders of all kinds
- This provided a framework for a series of courses
  - General accelerator physics
    - [Introduction to Accelerator Physics](#)
    - [Advanced Accelerator Physics](#)
  - Specialized topics in the field (RF, BI, magnets, vacuum, colliders, beam dynamics, plasma,...)
  - 50 to 70 hours teaching in **~2 week intensive residential courses**
- About 90 courses held so far
- Occasional courses in the framework of the US-CERN-Japan-Russia Joint Accelerator School (JAS), from 2022: IAS (International Accelerator School)
  - 14 schools held so far (since 1985), Superconductivity course upcoming in July 2022

# Upcoming Residential CAS Courses

- Networking is an essential part of each CAS course!
- Introduction to Accelerator Physics (yearly – in September)
  - 16 Sep – 1 Oct 2022 (venue to be decided)
  - Hands-on in transverse and longitudinal beam dynamics
- Advanced Accelerator Physics
  - 6 – 18 Nov 2022 in Sévrier (near Annecy), France
  - Hands-on in RF, Beam Instrumentation and Beam Dynamics
- 2023+: Radiofrequency, Magnets, Mechanical and Material Engineering, ...

# Basics of Accelerator Physics and Technology

- Course established in 2013
- **Introductory level training in General Accelerator Physics**
  - reviews the **core topics of accelerator physics**
  - special **emphasis on CERN** machines
- mainly for engineers and technical engineers, who have not yet attended one of the regular CERN Accelerator School Introductory courses
- slightly **easier level** than the Introductory Course
  - subset of topics (five days only)
  - no hands-on exercises
- Originally this course was for CERN participation only, but since 2018 it is also available for anyone not working for CERN

# This course

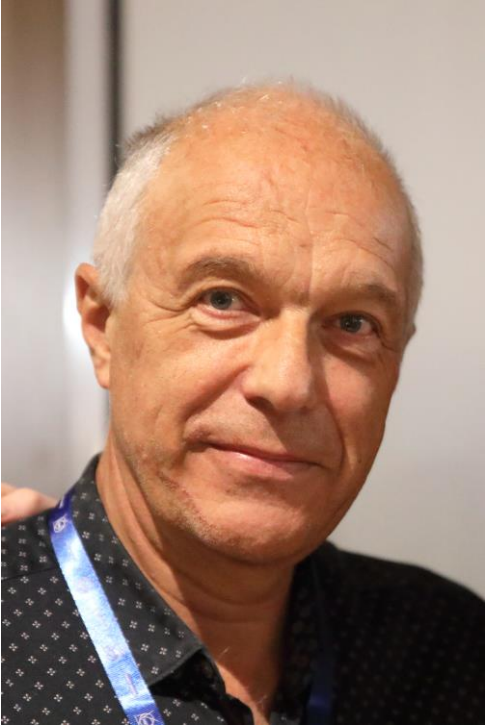
- 80 participants (65 CERN, 15 ext.)
- Lectures 45-50 minutes + discussion
- Discussion sessions with lecturers
- Lunch and coffee breaks on the other side of reception (left from coming in)
- use them for networking
- Welcome drink tonight!

Program for the CAS@Ferney - Basics of Accelerator Physics and Technology, 9-13 May 2022					
	Mon 09	Tue 10	Wed 11	Thu 12	Fri 13
08:30	Welcome	Coffee			
08:45	Accelerators for Beginners and the CERN Complex <i>Steerenberg</i>	Transverse Beam Dynamics I <i>Holzer</i>	Transverse Beam Dynamics III <i>Holzer</i>	Injection and Extraction <i>Dutheil</i>	Collective effects <i>Buffat</i>
09:45	Pause				
09:55	Basic Mathematics and Units <i>Steerenberg</i>	Normal Conducting & Permanent Magnets <i>Zickler</i>	Longitudinal Beam Dynamics II <i>Tecker</i>	Cryogenics <i>Koettig</i>	Plasma Wakefield Acceleration + AWAKE <i>Gschwendtner</i>
10:55	Coffee				
11:25	Electromagnetic Theory <i>Skowronski</i>	Longitudinal Beam Dynamics I <i>Tecker</i>	Beam Instrumentation <i>Lefevre</i>	Linear Imperfections <i>Wenninger</i>	HL-LHC <i>Zerlauth</i>
12:25	Lunch				
13:50	Relativity for Accelerators <i>Shreyber</i>	Transverse Beam Dynamics II <i>Holzer</i>	RF Systems <i>Damerau</i>	Discussion	Future Linear Colliders <i>Stapnes</i>
14:50	Pause				
15:00	Particle Sources <i>Kühler</i>	Discussion	Discussion	Controls <i>Deghaye</i>	Future Circular Colliders <i>Buffat</i>
16:00	Coffee				
16:30	Standard Model and Beyond <i>Sphicas</i>	Linacs <i>Lombardi</i>	Superconducting Magnets <i>Todesco</i>	Vacuum Systems <i>Baglin</i>	Discussion
17:30	Welcome drink				

# The CAS Team

**Anastasiya Safronava**

Web pages



**Hermann Schmickler**

previous Director



**Noemi Caraban Gonzales**

CASopedia

**Christine Völlinger**

Deputy Director

**Michela Lancellotti**

Social media

**Frank Tecker**

Director

**Delphine Rivoiron**

Administrative Manager

**Ron Suykerbuyk**

Filming

Frank Tecker, Opening CAS 2022

# Online Evaluation Form

- Important to maintain / improve the high quality of teaching
- <https://cas.web.cern.ch/evaluation/ferney-voltaire-2022>
- Log in with CERN account or many other ways (Google, LinkedIn, ...)

Sign in with a CERN account


Username


Password

[Forgot Password?](#)


Sign In


Or use another login method

 Two-factor authentication

 Kerberos


Sign in with your email or organisation


 Home organisation - eduGAIN


 External email - Guest access


Or sign in with a social account

By clicking on the buttons below, you consent to CERN's transfer of your login request to the social provider and to receive your account name, name and e-mail for authenticating you. Click [here](#) for more details.

 Google

 LinkedIn

 GitHub

 Facebook

# Online Evaluation Form

Level	Content	Presentation	Relevance
<input type="radio"/> Much too low	<input type="radio"/> Completely uninteresting	<input type="radio"/> Very poor	<input type="radio"/> Should not be in this CAS course
<input type="radio"/> Low	<input type="radio"/> Uninteresting	<input type="radio"/> Poor	<input type="radio"/> Specialist information - good, but not for me
<input type="radio"/> Just right	<input type="radio"/> Of some interest	<input type="radio"/> Fair	<input type="radio"/> Contributes to the general accelerator education
<input type="radio"/> Too high	<input type="radio"/> Interesting	<input type="radio"/> Good	<input type="radio"/> Important general information
<input type="radio"/> Much too high	<input type="radio"/> Very interesting	<input type="radio"/> Very good	<input type="radio"/> Directly relevant for my present studies

Other comments on this lecture...

☒ SAVE DRAFT

SUBMIT

- Please **fill it in** ideally **daily** during the course, when your memory is fresh
- You can **save it** and come back to it later at any time
- Just **DON'T submit it until** you have completed your evaluation at **the end**





The CERN Accelerator School

# Basics of Accelerator Physics and Technology

## Enjoy the course!

