

The CERN Accelerator School

- 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, yearly, alternating between
 - Introduction to Accelerator Physics
 - Advanced Accelerator Physics
 - Specialized topic in the field, **was yearly, now two per year**
- 56 schools held so far
 - 50 to 60 hours teaching in **2 week intensive residential courses**
- Occasional courses in the framework of the US-CERN-Japan-Russia Joint Accelerator School (JAS)
 - 11 schools held so far (since 1985)

Scope

Accelerator Physics

Relativity / Electro-Magnetic Theory / Transverse Beam Dynamics / Longitudinal Beam Dynamics / Linear Imperfections and Resonances / Synchrotron Radiation / Electron Beam Dynamics / Multi-Particle Effects / Non-Linear Dynamics Beam Instabilities / Landau Damping / Beam-Beam Effects

Accelerator Systems

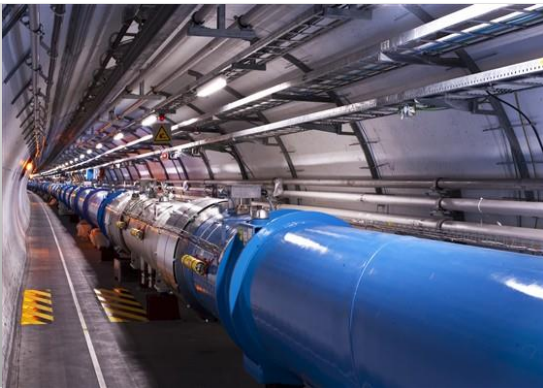
Particle Sources / RFQ / LEBT
RF Systems / Beam Instrumentation / Feedback Systems / Beam Injection and Extraction / Beam Transfer Power Convertors / Warm Magnets / Superconducting Magnets / Vacuum Systems Machine Protection Systems Radiation and Radioprotection

Accelerators

Linear Accelerators
Synchrotron Light Machines
FELs
FFAGs
Cyclotrons
Synchrotrons
Colliders

Applications

High Energy Physics
Nuclear Physics
Industrial Applications
Medical Applications
Cancer Therapy























The CERN Accelerator School holds courses in all of the member states of CERN

The Twenty Member States of CERN

One

Member States (Dates of Accession)

	AUSTRIA (1959)
	BELGIUM (1953)
	BULGARIA (1999)
	CZECH FR (1993)
	DENMARK (1953)
	FINLAND (1991)
	FRANCE (1953)
	GERMANY (1953)
	GREECE (1953)
	HUNGARY (1992)
	ITALY (1953)
	NETHERLANDS (1953)
	NORWAY (1953)
	POLAND (1991)
	PORTUGAL (1986)
	SLOVAK FR (1993)
	SPAIN (1/1961-12/1968-1/1983)
	SWEDEN (1953)
	SWITZERLAND (1953)
	UNITED KINGDOM (1953)



– 2014

- Power Converters
 - Baden, Switzerland
- Introduction to AP
 - Prague, Czech Republic
- Machine Protection
 - CA, USA (with USPAS ++)
- Plasma Wake Acceleration
 - CERN

– 2015



- Medical Applications
 - Vienna, Austria
- Advanced AP
 - Poland
- Intensity Limitations
 - CERN

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Israel 2014



The CERN Accelerator School (CAS) and the Paul Scherrer Institute (PSI) are organizing a course on

Power Converters

07 – 14 May, 2014

Hotel du Parc, Baden, Switzerland

This course will mainly be of interest to staff in accelerator laboratories, university departments and companies manufacturing accelerator equipment. The course will cover components and topologies of the different types of power converters needed for particle accelerators.

Issues of design, control and exploitation in a sometimes hostile environment will be addressed. Site visits to ABB and PSI will provide an insight into state-of-the-art power converter production and operation, while topical seminars will complement the lecture programme.



All technical photos courtesy of the Paul Scherrer Institute



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cern.ch/schools/CAS



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PROGRAMME FOR POWER CONVERTERS, BADEN, SWITZERLAND
7 - 14 May, 2014

Time	Wednesday 7 May	Thursday 8 May	Friday 9 May	Saturday 10 May	Sunday 11 May	Monday 12 May	Tuesday 13 May	Wednesday 14 May
08:30	A R R I V E L D A Y Registration Buffet Dinner	Introduction and Accelerator Basics	Power Converters and Power Quality I	RF Solid State Amplifiers	E X C U R S I O N	Thermal Design	Half Day at ABB + Half Day at PSI	Simulations
09:30		R. Bailey	K. Kahle	J. Jacob		R. Kuenzi		N. Ngada
09:30		Requirements on Power Converters	EMC	Long Pulse Converters		Design Methods and Tools		Power Converters for Accelerators
10:30		J.-P. Burnet	A. Charoy	J. Eckoldt		T. Meynard		R. Visintini
		COFFEE	COFFEE	COFFEE		COFFEE		COFFEE
11:00		Definition of Power Converters I	Power Converters and Power Quality II	Solid State Power Modulators		Regulation Theory		Putting It Into Practice
12:00		D. Aguglia	D. Siemaszko	J. Biela		F. Bouvet		J.-P. Burnet
12:00		Definition of Power Converters II	Switched Mode 1 Q Converters	Power Converter Controls: Radiation Risks & Mitigations		High Precision Current Measurement for Power Converters		Closing Remarks
13:00		D. Aguglia	R. Petrocelli	B. Todd		M. Cerqueira		R. Bailey
		LUNCH	LUNCH	LUNCH		LUNCH		LUNCH
14:30		Active Devices	Switched Mode 4 Q Converters	Power Filter Design		A Review of ADCs & DACs and their Application		D
15:30		M. Rahimo	Y. Thurel	R. Kuenzi		J. Pickering		E
15:30		Passive Devices Magnetic	Converters for Low Frequency Machines	Protection and Interlocks		Controls and Interfaces		P
16:30		P. Viarouge	J.-F. Bouteille	B. Todd		Q. King		A
		TEA	TEA	TEA		TEA		R
17:00		Passive Devices Capacitive	Seminar Proton Therapy	Seminar Swiss FEL, the X-Ray Free Electron Laser at PSI		Seminar Overview on Latest Development of ABB's Power Semiconductors Technology and Research Topics		T
18:00		R. Gallay	G. Goitein	H. Braun		I. Nistor		U
19:00	Registration				R			
19:30	Buffet Dinner	Dinner	Dinner	Dinner	E			
		Dinner	Dinner	Dinner	Dinner			

Generalities

- All lectures and seminars are here
- Breakfast you have seen
- Lunch and dinner in a different place
 - Tickets for drinks at dinner (2 per person)
- Coffee breaks in the foyer
- Secretariat at other end of foyer
- Company exhibits in the foyer
- Handouts distributed every morning (?)

- Photo on Friday at 10.30, meet in reception
- Excursion on Sunday
 - Let Barbara know if you do not want to come
- Visit to ABB and PSI on Tuesday
 - We assume that everyone will come

Excursion on Sunday

- Depart by bus Hotel du Parc at 09.45 sharp
- Boat on the Rhine 11.30 (about 1h15)
- Rhine Falls 12.45 to 15.00
 - Packed lunch – pick up from reception on Sunday morning
- Boat on the Rhine 15.00 (about 1h15)
- Visit monastery at Rheinau 16.30
- Depart by bus Rheinau at 18.00
- Dinner in Zurich (Zeughauskeller) 19.30 to 22.00
- Depart by bus Zurich 22.15
- Arrive at Hotel du Parc 22.45

Visit to ABB and PSI on Tuesday

- Depart by bus Hotel du Parc at 08.30 sharp for ABB
 - Visit ABB Power Electronics in Turgi 09.00 to 12.00
- Bus to PSI at 12.00
 - Lunch at PSI (vouchers on the bus)

14:15 – 14:45	Welcome to PSI Introduction of Power Electronics Group at PSI			
14:45 – 15:00	Forming groups			
	1	2	3	4
15:00 – 15:30	Tour A	Tour B	Tour C	
15:30 – 15:40	Changing			
15:40 – 16:10	Tour B	Tour A		
16:10 – 16:40	Coffee Break at Cafeteria Timeout			
16:40 – 17:10	Tour C		Tour A	Tour B
17:10 – 17:20			Changing	
17:20 – 17:50			Tour B	Tour A
17:50 – 18:00	Go to buses			
18:00 – 18:30	Bus Transfer from PSI West to Hotel Du Parc			

Tour A: SwissFEL Test Facility
 Tour B: Center for Proton Therapy
 Tour C: Power Electronics at PSI

