



# XVIII International Linac Conference

Geneva, Switzerland

August 26–30, 1996

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[Compendium of Scientific Linacs](#)

**Editors: C. Hill, M. Vretenar**



Organisation Européenne pour la Recherche Nucléaire  
**CERN** European Organization for Nuclear Research



## **Abstract**

These Proceedings cover the whole field of linear accelerators, from its original and continuing role in particle physics research to the wide range of applications found today in many other disciplines and technologies. The contributions were deliberately spread among the different conference sessions in order to maintain a broad interest.

The topics covered include: the design, construction and control of linear accelerators and the associated technology; dedicated test facilities, injection, wakefields, bunching, halo, dynamics, radio-frequency (RF), electron and ion accelerators, (laser) ion sources; active alignment, beam steering and spot size; simulation, monitoring and diagnostics; a description of the performance and current status of many machines, including proposed ones such as CLIC, the NLC and TESLA; applications to medical diagnosis and radiotherapy; use in the treatment and sterilisation of materials (including food) and in the reprocessing of radioactive waste; use as potential suppliers of energy.

## Foreword

The Eighteenth International Linac Conference (Linac96) was held at the Penta Hotel, Geneva, Switzerland, from August 26 until August 30, 1996. The conference was attended by 319 participants from 16 countries. At the International Organizing Committee meeting held in Dallas in May 1996, there was a strong desire to have an industrial exhibition. This was organized and held in the hotel from Monday morning to Thursday afternoon with ten exhibitors from various countries.

The general format of the programme followed, with slight modifications, the tradition of this conference: no parallel sessions, morning sessions with invited talks and afternoon poster sessions. There were altogether more than 120 proposals for invited talks from the International Advisory Committee and the Programme Committee. That, and in addition the steady extension of the field of electron and ion accelerators, led to the decision to include, besides the traditional 30 minute presentations, also 20 minute talks. This allowed in total 40 invited papers (three in the afternoon before the poster sessions). The electron and ion topics were nearly equally distributed amongst the invited talks and were smoothly mixed in the sessions. In total there were about 230 posters presented.

Following the PAC and ICHEA Conferences in Dallas in 1995 and the EPAC in 1996, we have decided to publish the proceedings in three forms, two of which are being used for the first time at a Linac Conference:

1. The traditional paper version of the Proceedings will be published and distributed to the Conference participants, as well as to selected libraries. This is the official record of the Conference.
2. An electronic version of the Proceedings was available on the World-Wide Web soon after the end of the Conference.
3. A higher quality electronic version of the Proceedings on a CD-ROM will be distributed to the participants.

WWW was used extensively for disseminating the different announcements before the conference.

The last Compendium of Linacs was published in 1976. We intended to produce a new one, an idea that was welcomed by the International Committee. Now, after 20 years, a new and updated version was prepared for the Linac96 Conference. Medical and industrial linacs are not included, the objective of this Compendium being to present all scientific linacs around the world, either in operation, in construction or proposed. We have included 176 “scientific” linacs, distributed over 3 continents (61 in America, 37 in Asia and 78 in Europe).

The Conference started off with a welcome cocktail on Sunday evening (25th August). On Wednesday afternoon we had an excursion to visit the region of Gruyère with different programmes showing typical Swiss landscapes and activities. Participants were free to choose between a visit to the old town of Gruyères with its famous castle and art exhibition, to visit the Nestlé chocolate factory in Broc, to have a walk from the village of Moléson (about 5 km from Gruyères) on the “Sentier des Fromageries” (path of the cheese makers) with a visit to a 17th century cheese-making cottage in Moléson. For good mountain walkers there was a special programme with a tour from the village of Moléson to the top of the Moléson mountain

(2002 m) and descent by cable-car afterwards or the inverse. In the evening, we had a cocktail and dinner in the ancient castle Château d'Oron.

The Companions' Programme included also a variety of activities. It started off on Monday with a Geneva tour through the old town and other important places. Tuesday saw a trip "Salt, bread and wine" with a visit to the "Bread and Wheat House" in Echallens, a visit to a salt mine and to a wine cellar with tasting of regional wines. A boat trip from downtown Geneva to the mediaeval town of Yvoire in France took place on Thursday, in parallel with a full-day excursion to Chamonix, featuring an easy mountain walk from the Plan des Aiguilles (2310 m) to Montenvers (1913 m) beside the magnificent glacier "Mer de Glace".

The traditional conference dinner took place in the Mövenpick Hotel on Thursday evening, starting with a talk by Edward A. Knapp on work done at the Santa Fe Institute, with the title "New Directions for Science". The State of Geneva was represented by Philippe Joye, State Counsellor, and the Commune of Meyrin by its Mayoress, Mrs. Madeleine Bernasconi. Swiss music, with typical instruments and songs, was presented by a folklore group. This evening was attended by some 340 participants and companions.

A visit to CERN was arranged on Friday afternoon, with a short introductory talk by Kurt Hübner, the CERN Director of Accelerators. The guided tour presented Linac 2 for protons, Linac 3 for Pb-ions, the LIL linac for electrons and positrons and one of the huge LEP experiments.

The International Organizing Committee met on August 27 and decided that the 20th International Linac Conference will be organized by SLAC in the year 2000 (reminder: the next one, in 1998, will be organised by Argonne). A strong option has been retained for Korea for the year 2002. The rhythm of two conferences in the US and two outside seems to find strong support.

Thanks are due to our sponsors [Alge Elektronik AG (Austria), Leclanché Capacitors (Switzerland), Olivetti SA (Switzerland), Salzgeber-Mechatronik (Austria), Telsa-Electronique SA (Switzerland) and VAT Vakuumventile AG (Switzerland)] and the local authorities (the Commune of Meyrin and the Government of the Republic and Canton of Geneva) who supported us, in particular with the wine for the welcome cocktail, the inauguration of the Industrial Exhibition and the conference dinner. We are grateful to the Programme Committee, the Local Organizing Committee, the PS Secretariat and, of course, to CERN and especially to all those who participated in the publication of these proceedings, for their excellent work.

H.D. Haseroth  
Conference Chairman

## CONFERENCE ORGANIZATION

Conference Chairman: H.D. Haseroth CERN

### International Organizing Committee

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### Conference Secretariat

S.L. Neboux		
E. Bryant	C. Galmant	T. Kehrer

**LINAC96 SESSION TIMETABLE**

Monday 26th August		Tuesday 27th August		Wednesday 28th August		Thursday 29th August		Friday 30th August	
8:30	<b>Welcome and announcements</b>	8:30	<b>TU101</b> <b>G.A. LOEW (SLAC)</b> Review of Linear Colliders	8:30	<b>WE101</b> <b>H. HAYANO (KEK)</b> ATF Linac Commissioning	8:30	<b>TH101</b> <b>J. BILLEN (LANL)</b> Smooth Transverse and Longitudinal Focusing in High-Intensity Ion Linacs	8:30	<b>FR101</b> <b>R.B. PALMER (BNL)</b> The Design of High Luminosity $\mu^+$ Colliders
9:00	<b>MO101</b> <b>W.K.H. PANOFSKY (SLAC)</b> The Creation of SLAC Leading to 30 Years of Operation	9:00	<b>TU102</b> <b>T.O. RAUBENHEIMER (SLAC)</b> SLC Status and NLC Design and R&D	9:00	<b>WE102</b> <b>I. WILSON (CERN)</b> CLIC Test Beam Facilities Status and Results	9:00	<b>TH102</b> <b>Y. YAMAZAKI (KEK)</b> Design Issues for High Intensity, High-Energy Proton Accelerators	9:00	<b>FR102</b> <b>P.B. WILSON (SLAC)</b> Advanced RF Power Sources for Linacs
9:30	<b>MO102</b> <b>M. PROME (CEA)</b> Major Projects for the Use of High Power Linacs	9:30	<b>TU103</b> <b>J. ROSSBACH (DESY)</b> New Linac Based FEL Projects using Bright Electron Beams	9:30	<b>WE103</b> <b>R. WANZENBERG (DESY)</b> Review of Beam Dynamics and Instabilities in Linear Colliders	9:30	<b>TH103</b> <b>S. YU (LBNL)</b> Review of New Developments in the Field of Induction Linacs (Electrons and Ions)	9:30	<b>FR103</b> <b>S. CHATTOPADHYAY (LBNL)</b> Role of Lasers in Linear Accelerators
<b>10:00</b>	<b>Coffee/tea break</b>	<b>10:00</b>	<b>Coffee/tea break</b>	<b>10:00</b>	<b>Coffee/tea break</b>	<b>10:00</b>	<b>Coffee/tea break</b>	<b>10:00</b>	<b>Coffee/tea break</b>
10:30	<b>MO201</b> <b>B. DUNHAM (CEBAF)</b> CEBAF, A Status Report	10:30	<b>TU201</b> <b>H. HASEROTH (CERN)</b> Lead Ion Injector at CERN	10:30	<b>WE201</b> <b>M. DOHLUS (DESY)</b> Accelerating Structures for Multibunches	10:30	<b>TH201</b> <b>U. AMALDI (Univ. Milan)</b> TERA Programme : Medical Applications of Protons and Ions	10:30	<b>FR201</b> <b>G. FORTUNA (INFN)</b> Status of ALPI and Related Developments of Superconducting Structures
		10:50	<b>TU202</b> <b>U. RATZINGER (GSI)</b> The New GSI Injector Linac for High Current Heavy Ion Beams	10:50		<b>TH202</b> <b>A. WAMBERSIE (UCL)</b> Medical Applications of Electron Linacs			
11:00	<b>MO202</b> <b>D.J. SCHNEIDER (LANL)</b> APT Accelerator Technology	11:10	<b>TU203</b> <b>A. UENO (KEK)</b> Beam Test of the Preinjector and the 3 MeV H <sup>+</sup> RFQ with a New Field Stabilizer PISL	11:00	<b>WE202</b> <b>H. KUGLER (CERN)</b> Laser Ion Source Development for Heavy Ions	11:10	<b>TH203</b> <b>M.E. THUOT (LANL)</b> The Success and Future of EPICS	11:00	<b>FR202</b> <b>G. GESCHONKE (CERN)</b> Superconducting Structures for High Intensity Linac Applications
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14:00	<b>MO301</b> <b>W. GAI (ANL)</b> Performance of the Argonne Wakefield Accelerator (AWA) Facility and Initial Experimental Results	14:00	<b>TU301</b> <b>M.M. WHITE (ANL)</b> Construction, Commissioning and Operational Experience of the Advanced Photon Source (APS) Linear Accelerator	<b>Excursion to Gruyère</b>		14:00	<b>TH301</b> <b>A. ENOMOTO (KEK)</b> Upgrade to the 8 GeV Electron Linac for KEKB	14:00	<b>CERN Lunch and Visit (12:30-18:00)</b>
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- 3 Linear Colliders
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