

People and things

Experience in building and testing fibre detectors was illustrated by report from the WA84 group at CERN using a fibre target to look for beauty particles, from the L3 experiment at CERN's LEP electron-positron collider (where a subgroup uses a fibre calibration system for the tracking detectors), and from the 'spaghetti calorimeter' being developed in the Italian-funded LAA project at CERN and aiming for improved energy resolution in hadron calorimetry.

In addition, many proposals testified to the confidence in this tech-

nology. Fibre tracking and fibre calorimetry are a possibility for the next generation of hadron colliders, while fibre targets of up to 25 tonnes could be constructed for neutrino physics.

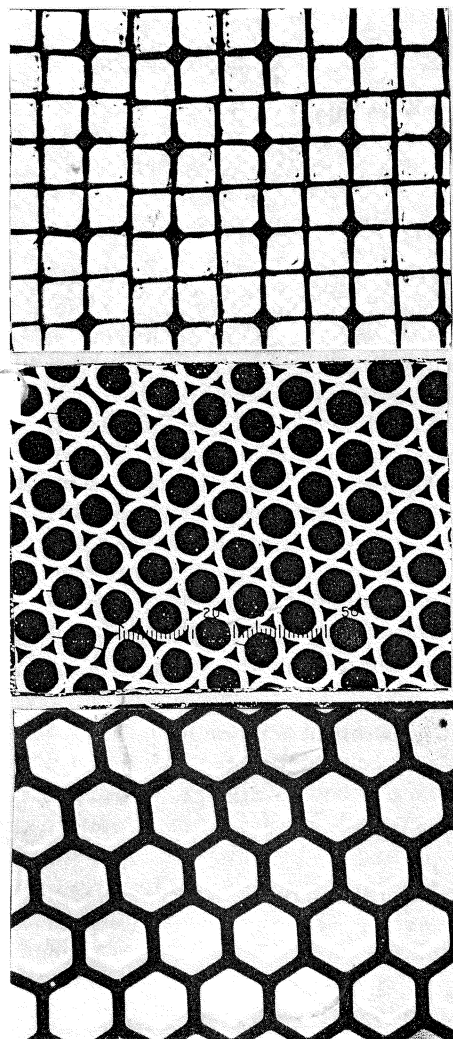
The second day of the meeting was given over to production possibilities and the characteristics of different products. Three different variants can be used in principle – plastic or glass fibres, and glass capillaries filled with scintillating liquids, and the advantages and disadvantages of each have to be carefully considered.

An example of technological progress is the one-metre attenuation lengths now achievable using coherent bundles of 20-micron fibres, bringing good light transmission with fine resolution.

A final topic was readout, hitherto dominated by image intensifier chains and CCDs. With future detectors probably having to handle at least ten million channels, new solutions are needed not only to build, but to pay for these devices!

The meeting was sponsored by Nuclear Enterprises and Schott Fibre Optics.

From R. Nahnauer (IHEP Zeuthen)



Scintillating fibres have attractions for detector specialists. Seen here are three cross-sections of bundled coherent light guides – top, 20 micron scintillating fibres from Schott (Mainz); centre, 20 micron capillaries from US Schott; and bottom, 30 micron plastic fibres from Kyowa Gas in Japan.

IUPAP elections

At the General Assembly of the International Union of Pure and Applied Physics (IUPAP) held in Dresden, Germany, in September, Yoshio Yamaguchi, currently Chairman of the International Committee for Future Accelerators (ICFA), was elected IUPAP's President Designate, to take over from current Chairman Yu. Ossipyan of the USSR Academy of Sciences in 1993.

IUPAP's C11 Commission on Particles and Fields consists of – T. Fujii (Tokyo, Chairman), F. Gudden (Siemens, Vice-Chairman), J. Haisinski (Orsay, Secretary), M. Baldeo-Ceolin (Padua), B. Barish (Caltech), P. Markov (Sofia), W.K.H. Panofsky (Stanford), V. Rubakov (Moscow), J. Sacton (Brussels), V. Singh (Tata, Bombay), V. Soergel (DESY), N. Tyurin (Serpukhov), Z.P. Zheng (Beijing).

On people

CERN Director General Carlo Rubbia has received the prestigious Umberto Biancamano European Prize, awarded annually for distinguished contributions towards the consolidation of European unity. Established in 1962 as a national Italian award, the prize was extended in 1971 to European personalities, the first such recipient being the artist Marc Chagall.

William J. Willis becomes Head of Brookhaven's Center for Accelerator Physics.

Denis McWhan has become Chairman of the US National Synchrotron Light Source at Brookhaven. Sam Krinsky, previously Acting Chairman, is his deputy.

ARGONNE NATIONAL LABORATORY

Argonne National Laboratory (ANL) is currently seeking several professionals for its 7-GeV Advanced Photon Source (APS) Project. The APS Project will be a national user facility producing extremely brilliant x-rays for applications in a broad range of scientific disciplines.

ELECTRONICS ENGINEER

A Master's or Ph.D. in E.E. or Physics and 1-5 years experience with low-level microwave design techniques or particle beam applications are necessary. (Box# 37995)

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A Ph.D. in E.E., 5 years experience and considerable knowledge of electromagnetic theory and high frequency RF design and analysis techniques are required. (Box# 82984)

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A B.S.E.E. and 5-10 years experience with RF circuitry and techniques are necessary. (Box# 36626)

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An advanced degree in E.E. and at least 4 years work experience are imperative. Knowledge and experience with the design and operation of pulsed and steady-state high current power supply systems is important. (Box# 82717)

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A B.S. or M.S. in M.E. and approximately 10 years experience in vacuum technology and the fabrication and machining of materials. (Box# 36620)

OPTO-MECHANICAL DESIGN ENGINEER

M.S./Ph.D. or equivalent plus 5-10 years experience and considerable knowledge and experience in opto-mechanical design are required. (Box# 82976)

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Leads APS Survey and Alignment Team. Develops field procedures to position accelerator and storage ring components at proper location and orientation to a high degree of accuracy. (Box# 82723)

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Requires a Ph.D. in Physics and 1-5 years experience with various accelerator systems. (Box# 81203)

The second position requires a Ph.D. and a background in radiofrequency systems including sources, waveguides and cavities. (Box# 82894)

Each of these positions commands an excellent salary and benefits package. Confidential consideration can be obtained by sending your resume, indicating position of interest, to: **Walter D. McFall, Box J-APS-(Box#)-88, Employment and Placement, ARGONNE NATIONAL LABORATORY, 9700 South Cass Avenue, Argonne, IL 60439, USA.** Argonne is an equal opportunity/affirmative action employer.

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BUCY CHAIR IN PHYSICS

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Applications and nominations are invited for a new chair in physics (experimental particle physics) endowed by J. Fred Bucy and Odetta Greer Bucy. The appointment will be at the rank of professor with tenure in the Department of Physics. Criteria for selection include distinguished research in experimental particle physics with an interest in Superconducting Super Collider collaboration and a commitment to physics teaching. The Department of Physics is developing a program in particle physics to augment existing programs in atomic-molecular-optical physics, condensed matter, chemical physics, biophysics, nuclear physics, and pulsed power. The department has 17 regular faculty members and approximately 50 graduate students who are pursuing Ph.D. and M.S. degrees in Physics or in Applied Physics. Applicants should submit a resume, list of publications, and statement of research and teaching plans, as well as the name of five references to:

Professor Walter L. Borst, Chairman,
Department of Physics
Texas Tech University
Lubbock, Texas 79409-1051
USA

The deadline for receipt of application materials is 1 March 1991.

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FACULTY POSITION

EXPERIMENTAL PARTICLE PHYSICS

AT THE SSC

PENN STATE UNIVERSITY

The experimental particle physics group at Penn State University is planning a significant increase in its involvement at the Superconducting Super Collider (SSC). Applications are invited for a faculty position. The level of the appointment will be commensurate with the experience of the candidate. Major facilities, including a VAX cluster, electronics laboratories and shop, on-line data acquisition facility, and mechanical shop and assembly areas are in place and available for SSC-related research. Applicants should have a Ph.D. degree in physics and at least two years of postdoctoral experience. An on-going presence and/or experience at an existing high energy collider facility is desirable. Send application, curriculum vitae and names of four references to

Professor Howard Grotch,
Head, Department of Physics
104 Davey Laboratory
Penn State University
University Park, PA 16802
USA

Applications received by 15 January 1991 will be assured of consideration. However, applications will be considered until the position is filled.

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At Los Alamos, Ed Knapp takes on the combined posts of Division Leader (administration) and Scientific Director of the Los Alamos Meson Physics Facility (LAMPF) following the retirement of Don Hagerman. Former LAMPF Director Gerald Garvey becomes Senior Laboratory Fellow.

John Stewart Bell 1928-1990

While quantum physics is one of the greatest scientific achievements of the twentieth century, it is also notorious, even among physicists, for being difficult to understand. CERN theorist John Stewart Bell, who died unexpectedly on 1 October, did much to remove these obstacles and unravel the paradoxes which riddle quantum theory and had led some early thinkers, notably Einstein, to be sceptical. Never fearing to enter intellectual territory where few others dared to tread, John Bell helped put the unfamiliar dogma of quantum mechanics on a firmer footing.

He moved from the UK to CERN in November 1960 for an active and prominent career. His famous 1964 Inequality specified how results of simultaneous measurements on separated physical systems can be correlated, and has been described as 'the most important recent advance in physics'. (With characteristic modesty, he described it himself as a 'dilemma'.) The Adler-Bell-Jackiw anomaly, found in 1969, pointed out profound questions in field theory.

Despite (or perhaps because of) his depth of understanding, he was also sympathetic with those he called the 'why bother?'ers', agreeing with them that 'ordinary quantum mechanics is just fine for all practical purposes'. Putting this ap-



proach into practice in the mid-60s, notably with Jack Steinberger, he helped cast the definitive formalism for the violation of CP symmetry. He also took a deep interest in accelerator physics, with contributions co-authored with his wife Mary. He was a Fellow of the Royal Society (UK) and in 1989 was awarded the coveted Dannie Heine-mann Prize for his contributions to mathematical physics.

John S. Bell 1928-1990.

EPS-8

Called 'Trends in Physics', the Eighth General Conference of the European Physical Society (hence EPS-8), held in Amsterdam from 4-8 September (in collaboration with the Netherlands Physical Society) saw strong representation from particle physics and particle physicists.

Plenary sessions included former CERN Director General Herwig Schopper with first results from CERN's LEP electron-positron collider, Gerard 't Hooft of Utrecht with prospects for the Theory of Everything, 1989

Nobel prize-winner Norman Ramsey on experiments on time reversal symmetry and parity, and Reinhard Stock of Frankfurt on nuclear matter under extreme conditions.

High energy matters merited two parallel sessions. Oxford's Roger Cashmore chaired one stream including physics from LEP together with news and prospects for existing and proposed hadron colliders, while CERN Director Walter Hoogland presided over sessions on accelerator technology and control.

Assistant Professor Position Experimental High Energy Physics

University of Illinois at Urbana-Champaign

The Department of Physics at the University of Illinois at Urbana-Champaign anticipates making a tenure-track faculty appointment in the area of Experimental High Energy Physics. Salary is commensurate with experience; the appointment would begin in the Fall of 1991. Our principal interest is in the candidate's ability to teach effectively at both undergraduate and graduate levels and to lead a vigorous and significant research program.

The high energy physics group in Urbana is involved in a number of experiments including studies of CP and CPT in the K meson system (E773, E799), charm and bottom physics (E687), hadron collider physics (CDF and SSC), Z physics (SLD), and high energy astrophysics (Fly's Eye). The group consists of ten faculty, several postdocs, and a number of graduate students. Our preference would be for the new faculty member to join one of the existing collaborations. The application deadline for full consideration is 15 January 1991.

Applicants should submit a *curriculum vitae*, publication list, and the names of three references to

A. C. Anderson
Head, Department of Physics
University of Illinois
Urbana
Illinois 61801
Tel. (217)333-3760

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UNIVERSITY OF CALIFORNIA, RIVERSIDE Faculty Position in Experimental High Energy Physics

The Department of Physics at the University of California, Riverside expects to make a faculty appointment in the area of experimental high energy physics on or after 1 July 1991. This tenure-track appointment will be at the level of Assistant Professor. The department is seeking candidates with outstanding research records and strong commitment to teaching. The individual appointed will be expected to join, for the near term, the ongoing Riverside research program in high energy electron-positron collisions. Please send a resumé and arrange to have at least three letters of recommendation sent to

Chair, Search Committee
Experimental High Energy Physics
Department of Physics
University of California, Riverside
Riverside,
California 92 521
USA

The deadline for receiving applications will be 15 February 1991. Any applications received after this date will be considered only if an appointment is not made from the original pool.

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Journal of Physics G: Nuclear and Particle Physics

Electron-Positron Annihilation Physics

Edited by **B Foster**, *University of Bristol, UK*

A detailed introduction and summary of the physics and techniques of e^+e^- annihilation, with particular emphasis on experimental work.

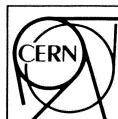
Contents: The standard model and QCD: Introduction. Gauge theories. The standard model of the electroweak interaction. Lepton pair final states. Quark pair final states. Boson pair final states. Conclusion. **Fragmentation:** Introduction. Fragmentation models. General features of fragmentation. Inclusive particle production. Heavy quark fragmentation. Gluon fragmentation. Summary and outlook. **Heavy quark and lepton physics:** Introduction. Review of experimental techniques. Weak interactions and decay properties of tau, charm and beauty quarks. Heavy quark mixing. Summary and future prospects. **Where do we go from here?** Introduction. Theories – an overview. New particle production. Rare decays. Precision measurements. Implications for detectors. Index.

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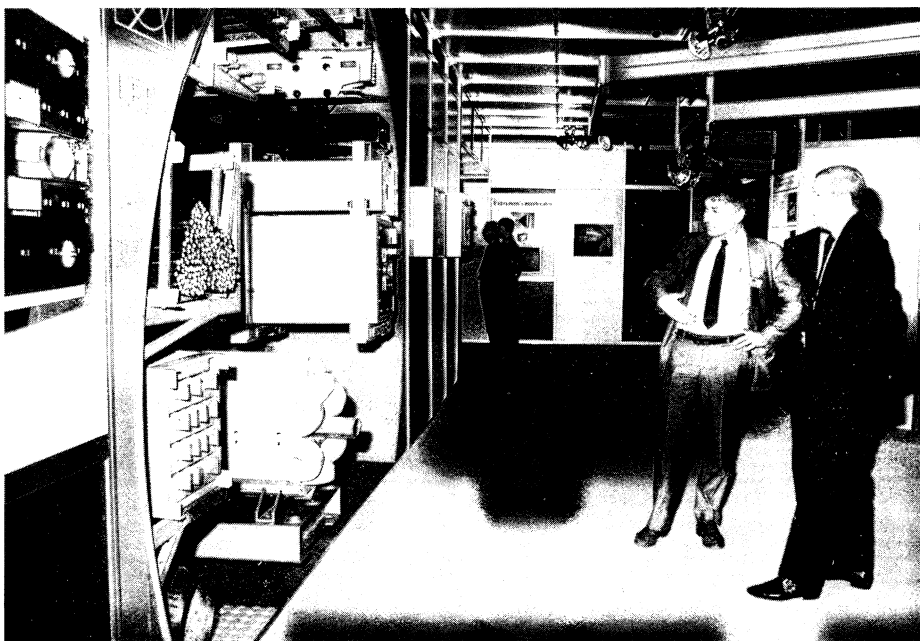
CERN Director General Carlo Rubbia (right) meets Israel's Minister of Science and Technology (and distinguished particle physicist) Yuval Ne'eman in Jerusalem on 8 September to sign an agreement covering future co-operation between Israel and CERN. This extends CERN's policy of setting up bilateral agreements to put ongoing collaboration with non-member states on a firmer footing.

Meetings

Particles and Fields '91, sponsored by the Division of Particles and Fields of the American Physical Society and the Division of Particle Physics, Canadian Association of Physicists, will be held from 19-22 August 1991 at the University of British Columbia, Vancouver. Contact PF91 Secretariat, TRIUMF, 4004 Wesbrook Mall, Vancouver, BC, Canada V6T2A3, tel (604) 222-1047, fax (604) 222-1074, bitnet pf91 at triumphcl

Prince Claus of the Netherlands (right) inaugurated the CERN exhibition at NIKHEF in September. The Prince, who chairs a national committee for the promotion of science, is seen here viewing a model of CERN's LEP tunnel with CERN Director Walter Hoogland. The exhibition was open throughout the week of the General Conference of the European Physical Society in Amsterdam and coincided with a NIKHEF Open Day.

(Photo J.S.E. Schäfer, NIKHEF-H)



US Particle Accelerator School

At the Snowmass Summer Study on High Energy Physics in the 1990s, sponsored by the American Physical Society, the US Particle Accelerator School awarded its prizes for this year to Donald Prosnitz of Livermore and Matthew Sands of Santa Cruz.

Prosnitz was cited for his contributions to the development of free electron laser amplifiers while Sands received his award for a lifetime of contributions to the science of beams and accelerators.

The US Particle Accelerator School's 1990 prizes went to (left) Donald Prosnitz of Livermore and to Matthew Sands of Santa Cruz.



Books

Salam on Dirac

Published by Cambridge University Press is 'Unification of Fundamental Forces' by Abdus Salam, taken from the 1988 Dirac Memorial Lectures at Cambridge (ISBN 0 521 37140 6). As well as tracing the increasing motivation of theorists to synthesize all the forces of Nature (where he has made vital contributions), Salam, with characteristic humility, expresses his admiration for the late Paul Dirac, the architect of modern quantum theory. As well as Salam's own address at Cambridge, the book includes the intriguing personal recollections given by Dirac and by another monumental twentieth-century intellect – Werner Heisenberg – at a 1968 symposium organized by the International Centre for Theoretical Physics in Trieste (of which Salam is founder and Director).

In a field where many authors continually use and reuse the same material, Salam has a flair for digging out something fresh. To illustrate Dirac's character he quotes from a reporter who went to see Dirac when the physicist visited the University of Wisconsin in 1934:

'I have been hearing about a fellow they have up at the University this Spring. A mathematical physicist or something they call him, who has been pushing Sir Isaac Newton, Albert Einstein and all the others off the front pages. His name is Dirac and he is an Englishman. So the other afternoon I knocks on the door of his office and a pleasant voice says 'Come in'.

And I want to say that this sentence 'Come in' was one of the longest emitted during our inter-

view. The minute I sees the twinkle in his eyes I knew I was going to like him. He did not seem to be at all busy. When I want to interview an American scientist of his class, he would blow in carrying a big briefcase, and while he talked he would be pulling lecture notes, proofs, books, reprints, manuscripts and what-have-you out of his bag.

Dirac is different. He seems to have all the time in the world and his heaviest work is looking out of the window.

'Professor,' says I, 'I notice you have quite a few letters in front of your name. Do they stand for anything in particular?' 'No,' says he.

'Fine,' says I, 'now will you give me the lowdown on your investigations?' 'No,' says he.

I went on. 'Do you go to the movies?'

'Yes.'

'When?'

'In 1920.'

Directions in High Energy Physics

Published by World Scientific, Singapore, under the personal supervision of Editor-in-Chief K.K. Phua, is the series 'Directions in High Energy Physics'. These books provide a valuable introduction for students, being more accessible than original literature and better organized than conference material. Each volume has its own editors, who commission contributors to provide individual chapters. The series so far consists of:

Volume 1 – High Energy Electron-Positron Physics (1988), edited by A. Ali and P. Söding;

Volume 2 – Hadronic Multiparticle Production (1988), edited by P. Carruthers;

Volume 3 – CP Violation (1989), edited by C. Jarlskog;

Volume 4 – Proton-Antiproton Collider Physics (1989), edited by G. Altarelli and L. Di Lella;

Volume 5 – Perturbative Quantum Chromodynamics (1989), edited by A.H. Mueller.

Forthcoming in the series are:

Volume 6 – Quark-Gluon Plasma, edited by R.C. Hwa;

Volume 7 – Quantum Electrodynamics, edited by T. Kinoshita;

Volume 8 – Interactions Between Elementary Particle Physics and Cosmology, edited by E. Kolb.

Future volumes under consideration include: Skyrmions, edited by A. Goldhaber; Quantum Group, Conformal Field Theories and Knot Theory, edited by L. Alvarez-Gaume and C. Gomez; Computing for High Energy Physics, edited by S.C. Loken; Quantum Field Theory and Statistical Mechanics, edited by J.L. Cardy; and Physics and Geometry by R. Jackiw.

CERN 'Yellow' reports 1989/1990

The following reports have been issued in the official CERN Reports series, since the last list in CERN Courier in December 1989:

CERN 89-09; Wilson, A; Henke, H

The LEP main ring accelerating structure

CERN, 8 Nov 1989. – 42 p

CERN 89-10 v.1; Fernandez, E; Jarlskog, G (eds)

Proceedings, v.1, ECFA study week on instrumentation technology at high-luminosity hadron colliders, Barcelona, 14–21 Sep 1989

CERN, 24 Nov 1989. – 392 p

CERN 89-10 v.2; Fernandez, E; Jarlskog, G (eds)

Proceedings, v.2, ECFA study week on instrumentation technology at high-luminosity hadron colliders, Barcelona, 14–21 Sep 1989

CERN, 24 Nov 1989. – 400 p

CERN 89-11; Quigg, C

The third Bernard Gregory Lectures
CERN, 31 Dec 1989. – 117 p

CERN 89-12; Schönbacher, H;
Tavlet, M

Compilation of radiation damage test
data ; Part 1, 2nd ed., Halogen-free
cable-insulating materials = Index des ré-
sultats d'essais de radiorésistance ; 1re
partie, 2e éd., Matériaux d'isolation de
câbles exempts d'halogène.
CERN, 31 Dec 1989. – 217 p

CERN 90-01; Billinge, R; Boltezar, E;
Boussard, D: *et al.*

Concept for a lead-ion accelerating
facility at CERN

CERN, 28 Feb 1990. – 40 p

CERN 90-02; Nakada, T *[ed]*

Feasibility study for a B-meson facto-
ry in the CERN ISR tunnel

CERN, 30 Mar 1990. – 96 p

CERN 90-03; CERN, Genève

Turner, S *[ed]*

Proceedings, CAS - CERN Accelerator
school ; Synchrotron radiation and free
electron lasers, Chester, UK, 6–13 Apr
1989

CERN, 2 Apr 1990. – 482 p

CERN 90-04; CERN, Genève

Turner, S *[ed]*

Proceedings, CAS - CERN Accelerator
school ; Third advanced accelerator
physics course, Uppsala, Sweden, 18–
29 Sep 1989

CERN, 24 Apr 1990. – 227 p

CERN 90-05; CERN, Genève

Wilson, E J N

Accelerators for the twenty-first
century – a review

CERN, 29 May 1990. – 28 p

Lectures in the Academic Training Pro-
gramme

CERN 90-06; CERN, Genève

Verkerk, C *[ed]*

Proceedings, 1989 CERN school of
computing, Bad Herrenalb, 20 Aug – 2
Sep 1989

CERN, 29 May 1990. – 347 p

CERN 90-07; CERN, Genève

Turner, S *[ed]*

Proceedings, CAS - CERN Accelerator
school ; Power converters for particle ac-
celerators, Montreux, 26 – 30 Mar 1990

CERN, 23 Jul 1990. – 381 p

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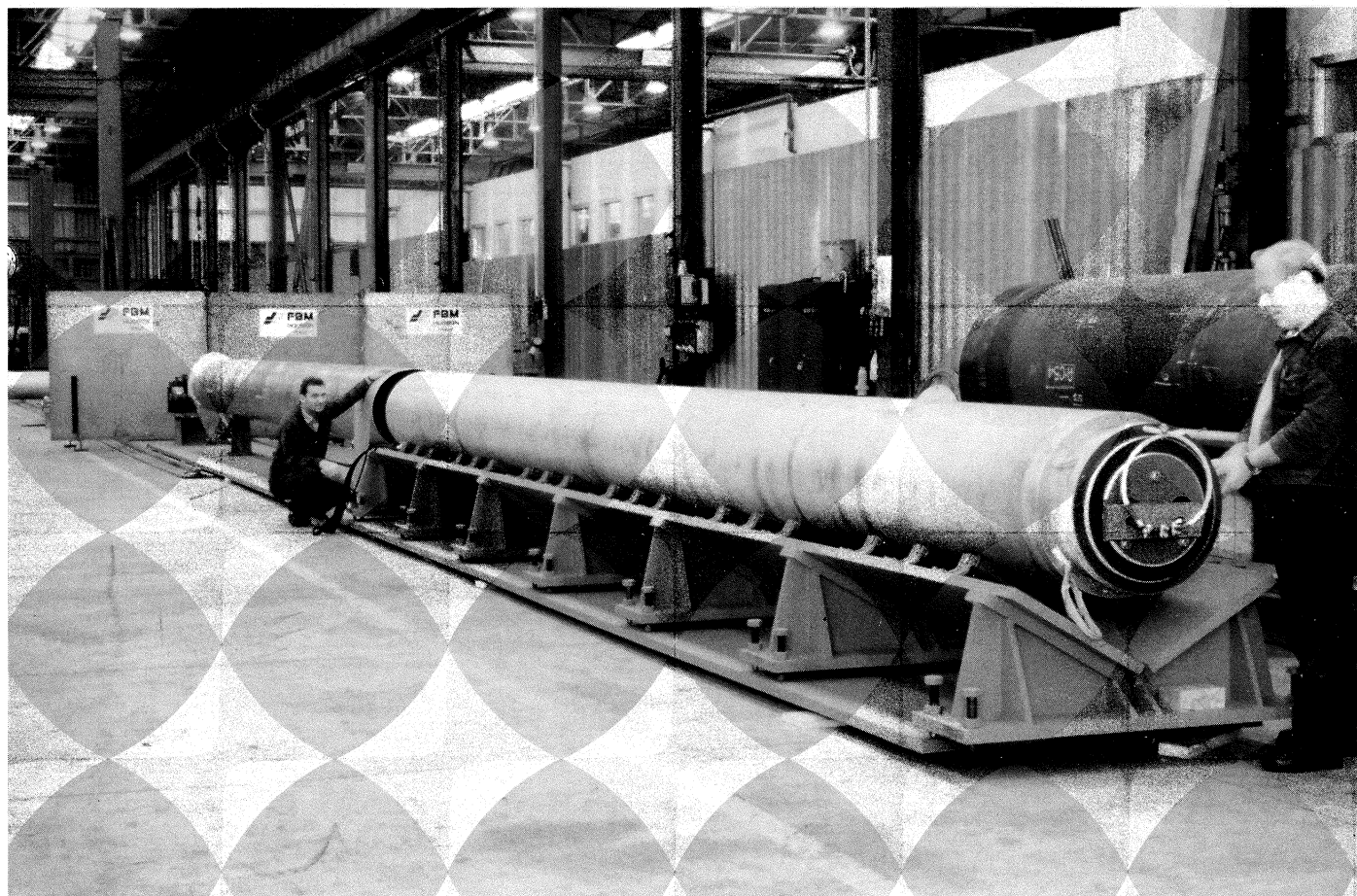
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CH-1211 GENEVA 23, Switzerland,*

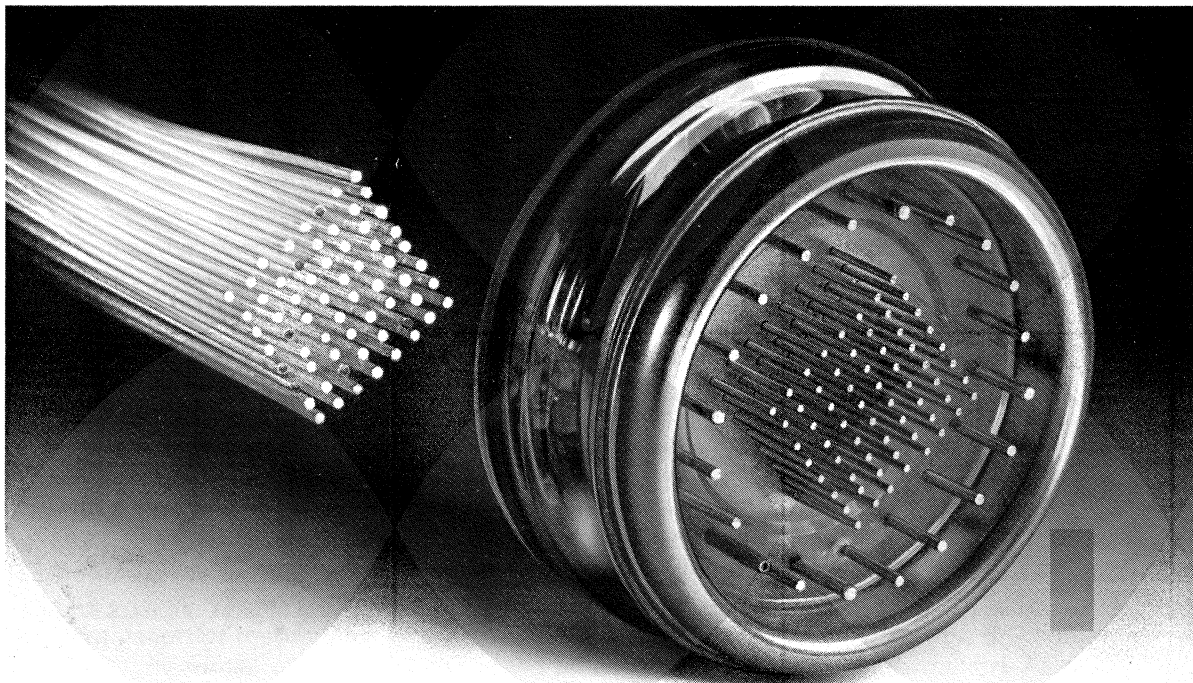
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The first full-length (10 metre) pre-prototype twin aperture superconducting dipole designed with the proposed LHC proton collider for CERN's LEP tunnel in mind was recently put into its cryostat at the FBM factory, Bergamo, Italy. Wound at ABB, Mannheim, Germany, and built with tooling developed for the superconducting ring at the HERA collider at DESY in Hamburg, the dipole is being sent to the French Saclay Laboratory for testing.

(Photo CERN AC002.10.90)

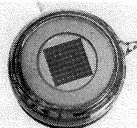




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