DE-FG03 94ER40875
University of Hawaii

**FINAL REPORT TO
THE DEPARTMENT OF ENERGY**

ON THE

**1994 INTERNATIONAL ACCELERATOR SCHOOL:
FRONTIERS OF ACCELERATOR TECHNOLOGY**

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University of Hawaii
Sept. 17, 1998

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The international accelerator school on Frontiers of Accelerator Technology was organized jointly by the US Particle Accelerator School (Dr. Mel Month and Ms. Marilyn Paul), the CERN Accelerator School, and the KEK Accelerator School, and was hosted by the University of Hawaii. The course was held on Maui, Hawaii, November 3-9, 1994 and was made possible in part by a grant from the Department of Energy under award number DE-FG03-94ER40875, AMDT M006. The 1994 program was preceded by similar joint efforts held at Santa Margherita di Pula, Sardinia in February 1985, South Padre Island, Texas in October 1986, Anacapri, Italy in October 1988, Hilton Head Island, South Carolina in October 1990, and Benalmedena, Spain in October/November 1992. The most recent program was held in Montreux, Switzerland in May 1998.

The purpose of the program is to disseminate knowledge on the latest ideas and developments in the technology of particle accelerators by bringing together known world experts and younger scientists in the field. It is intended for individuals with professional interest in accelerator physics and technology, for graduate students, for post-docs, for those interested in accelerator based sciences, and for scientific and engineering staff at industrial firms, especially those companies specializing in accelerator components.

A total of 108 participants and lecturers met at the Westin Maui Hotel for morning lectures and afternoon short courses on topics comprising "Frontiers of Accelerator Technology". Financial assistance was given to 26 university students, both foreign and U.S. The remaining 82 participants represented foreign and U.S. lecturers (33), national laboratory personnel (41), and private industry or military personnel (8).

The educational backgrounds of participants ranged from those with a PhD to a few at the undergraduate level. Interestingly, the combined number of graduate students and professionals with masters and bachelors degrees equalled the number of participants with a doctorate. It is believed that the addition of short-courses at this program, as opposed to previous international programs which were composed of only advanced topics, appealed to this broader audience.

Lectures were given on superconducting magnets, cryogenic, vacuum, RF, computer-based and beam feedback systems, as well as FEL's beam emittance and alignment, and linacs. Short courses were titled "High Field Superconducting Magnets", "Design of High Gradient Linacs", "Superconducting RF Technology", and "Instrumentation and Beam Feedback". Special seminars were held on synchrotron radiation; medical and industrial applications of

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accelerators; government, industry and accelerators; and accelerator technology frontiers. A copy of the program is included with this report. Proceedings from this program were published by World Scientific in 1996. The proceedings summarize the currently available knowledge on the technology driving the development of particle beams for science, medicine, industry, and defense. It is the most up-to-date collection of information on this technology available.

Also held during the Maui Course was a special workshop on "Backgrounds at the Machine-Detector Interface for B Factories, which was organized by Dr. Tom Browder of the University of Hawaii. The proceedings of this workshop are available separately as the "Proceedings of the 1994 Maui Workshop on Backgrounds at the Machine Detector Interface for B Factories", edited by Thomas E. Browder, UH 511-838-96. During the course, the University of Hawaii provided terminals connected with the Maui Supercomputer Center so that attendees could check email.

US-CERN-Japan Topical Course on
Accelerator Physics & Technology

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PROGRAM

(All general sessions will be held in the
Kula Room on the ground level)

Thursday, November 3, 1994

- 0830 Opening Remarks
H. Sugawara, KEK
- 0915 Superconducting Magnets I
High Fields & Uniformity
R. Scanlan, LBL
- 1000 Coffee/Tea Break
(Valley Isle Terrace)
- 1030 Superconducting Cavities I
Basics
W. Weingarten, CERN
- 1115 Photocathodes (e- Sources)
T. Nakanishi, Nagoya Univ.
- 1200 Break
- 1500 Short Courses
High Field Superconducting
Magnets (Humpback Room)
A. Devred, Saclay
Design of High Gradient Linacs
(Molokai Room)
H. Henke, Univ. of Berlin
Issues in Superconducting RF
Technology (Harpoon Room)
H. Padamsee, Cornell Univ
Instrumentation & Beam Feedback
(Wilcox Room)
G. Jackson, FNAL
R. Siemann, SLAC
- 1700 Refreshment Break
(Valley Isle Terrace)
- 1730 Seminar: Applications of
Synchrotron Radiation
T. Ishii, Univ. of Tokyo
- 1830 End of Session

Friday, November 4, 1994

- 0830 **Cryogenic Systems**
P. Lebrun, CERN
- 0915 **Superconducting Magnets II**
A. Effects, etc.
T. Shintomi, KEK
- 1000 **Coffee/Tea Break**
(Valley Isle Terrace)
- 1030 **Superconducting Cavities II**
Couplers, etc.
S. Noguchi, KEK
- 1115 **Ion Sources (H⁺, H-
Heavy Ions)**
Y. Mori, KEK
- 1200 **Break**
- 1500 **Short Courses***
High Field Superconducting
Magnets (*Humpback Room*)
A. Devred, Saclay
Design of High Gradient Linacs
(*Molokai Room*)
H. Henke, Univ. of Berlin
Issues in Superconducting RF
Technology (*Harpoon Room*)
H. Padamsee, Cornell Univ
Instrumentation & Beam Feedback
(*Wilcox Room*)
G. Jackson, FNAL
R. Siemann, SLAC
- 1700 **Refreshment Break**
(Valley Isle Terrace)
- 1730 **Seminar: Medical, Industrial &
Other Applications of Accelerators**
O. Barbalat, CERN
- 1830 **End of Session**

Saturday, November 5, 1994

- 0830 **Vacuum Systems**
A.G. Mathewson, CERN
- 0915 **FELs High Power &
Bunching**
S. Hiramatsu, KEK
- 1000 **Coffee/Tea Break**
(Valley Isle Terrace)
- 1030 **High Power RF Sources**
V. Granatstein,
University of Maryland
- 1115 **Wigglers and Undulators**
H. Kitamura, KEK
- 1200 **End of Session**

Sunday, November 6, 1994**FREE DAY**

*Please note that meeting rooms change
on Monday & Tuesday

Monday, November 7, 1994

- 0830 RF Feedback Systems
Beam Loading
F. Pedersen, CERN
- 0915 Higher Order Mode Damping
Y. Yamazaki, KEK
- 1000 Coffee/Tea Break
(Valley Isle Terrace)
- 1030 Beam Feedback Systems
G. Lambertson, LBL
- 1115 Computer-Based Feedback and
Correction Models
T. Himel, SLAC
- 1200 Break
- Special Seminars:
- 1330 Muon-Muon Colliders
R. Palmer, BNL
- 1415 LHC - Large Hadron Collider
P. Lebrun, CERN
- 1500 Short Courses
High Field Superconducting
Magnets (Carthaginian Room)
A. Devred, Saclay
Design of High Gradient Linacs
(Nantucket Room)
H. Henke, Univ. of Berlin
Issues in Superconducting RF
Technology (Pequod Room)
H. Padamsee, Cornell Univ
Instrumentation & Beam Feedback
(Wilcox Room)
G. Jackson, FNAL
R. Siemann, SLAC
- 1700 Refreshment Break
(Valley Isle Terrace)
- 1730 Seminar: Government/Industry
and Accelerators
C. Roche, CERN
- 1830 End of Session

Tuesday, November 8, 1994

- 0830 Instrumentation-Pickups
& Diagnostics
F. Caspers, CERN
- 0915 Beam Alignment
M. Mayoud, CERN
- 1000 Coffee/Tea Break
(Valley Isle Terrace)
- 1030 Final Focus Diagnostics
T. Shintake, KEK
- 1115 Transverse Emittance Control
G. Guignard, CERN
- 1200 Break
- 1500 Short Courses
High Field Superconducting
Magnets (Carthaginian Room)
A. Devred, Saclay
Design of High Gradient Linacs
(Nantucket Room)
H. Henke, Univ. of Berlin
Issues in Superconducting RF
Technology (Pequod Room)
H. Padamsee, Cornell Univ
Instrumentation & Beam Feedback
(Wilcox Room)
G. Jackson, FNAL
R. Siemann, SLAC
- 1700 Refreshment Break
(Valley Isle Terrace)
- 1730 Round Table: The Accelerator
Technology Frontier
H. Gruner, CEBAF (Chair)
- 2000 Banquet (on the Lanai Pool Deck)