Experientia Supplementum 24

Seventh International Conference on Cyclotrons and their Applications

19-22 August 1975

Seventh International Conference on

Cyclotrons and their Applications

Zürich, Switzerland, 19-22 August 1975

organized by
Swiss Institute of Nuclear Research (SIN)

sponsored by
Swiss Federal Institute of Technology, Zürich (ETHZ)
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Proceedings
Editorial Chairman
W. Joho

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FOREWORD

The 7th International Cyclotron Conference, held in Zürich from 19-22 August, 1975, was attended by 231 registered participants from 21 different countries. Visitors came from all 5 continents, showing the truly international character of the so-called cyclotron family. After a slight slump around 1970 in science funding in general, it is encouraging to see that cyclotrons emerge again with a promising future, rich in applications. For an informal summary of the topics and highlights of this conference, the reader is referred to the back inside cover of these proceedings. There Henry Blosser, from Michigan State University, a very active pioneer in the cyclotron field, put down his impressions in a matter of ten minutes after some small pressure from the editor.

Two and a half days were devoted to status reports on running cyclotrons, new proposals, and many technical reports on the know-how of cyclotrons. Half a day was spent on a visit to the cyclotron facilities at SIN, Villigen, and one full day on applications of cyclotrons in physics, engineering, biology and medicine. Dr. Kligerman from Los Alamos was showing to a packed auditorium (and to his cyclotron friends at TRIUMF and SIN) his brand new and very promising results from a first test with pion therapy. A panel session on "Accelerators for Hospitals" showed that cyclotrons are very strong candidates for radiation therapy with neutrons, protons and, more in the future, with pions. This panel session, and the one on "Computer Control for Cyclotrons", are included in these proceedings as recorded on tape, with only minor editing modifications.

In addition to 25 invited papers, a total of 103 papers were submitted for presentation at the conference. In order to avoid parallel sessions, only 30 papers were selected for oral presentation. The rest of the papers were displayed, with great success, in two poster sessions, with the authors explaining in detail to interested participants their reports. The high-light of the banquet was the after dinner speech by M.S. Livingston on the history of the cyclotron. The hit of the ladies program was the visit to a local chocolate factory. The rumour goes that some conference participants too preferred this visit to the session talks!

The list of old-timers who participated in all seven cyclotron conferences is now reduced to R. Richardson, J. Martin and H. Blosser.

Let me close with special thanks to the many people who contributed enthusiastically to these proceedings. The CERN Scientific Information Service gave invaluable support and help in editing (A. Jesse and A. Günther) and assistance with the typing (Mrs. Y. Piemontese). In addition, S. Adam, J. Collins, Miss E. Huber and Mrs. E. Pedroni of SIN helped putting together the panel sessions, list of participants, etc. R. Kramer caught the atmosphere of the conference with his camera, and a selection of his shots can be admired at the beginning and at the end of this book. Finally, we would like to thank F.T. Howard from Oak Ridge, who updated again the world list of cyclotrons for our conference.

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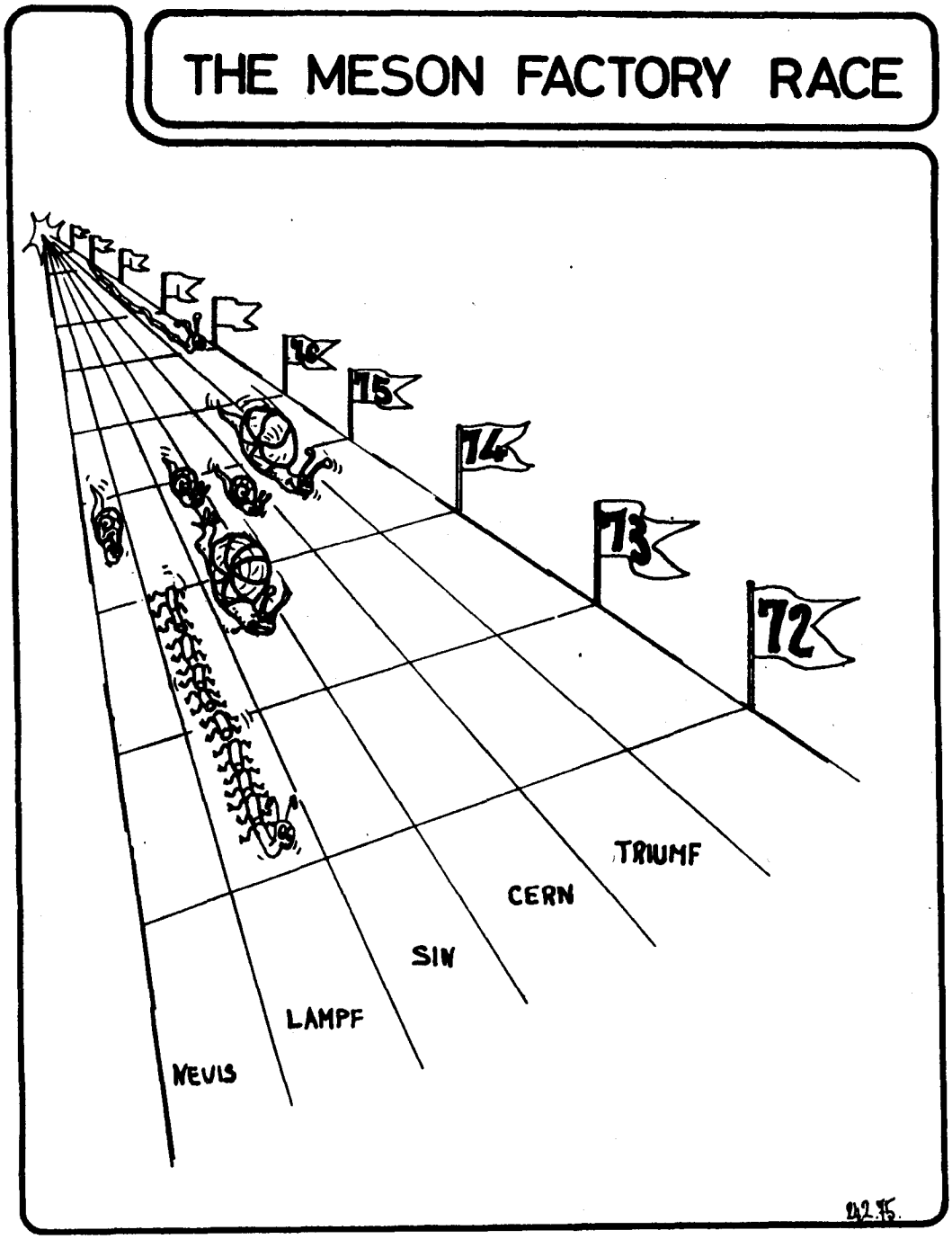

Dramatic scene, observed by a CERN-SC artist, showing the powerful LAMPF accelerator crossing its finishing line in 1972, followed by competing cyclotrons for which 1974 was a vintage year.

OPENING ADDRESS

J.P. Blaser, SIN, Villigen, Switzerland

It is a great pleasure for me to declare open the Seventh International Cyclotron Conference and to welcome the participants from all over the world who came here to exchange experience and work together a few days on the exciting field of cyclotrons and their applications.

I first wish to extend to you the greetings of the Board of ETH. It was this body, being responsible for SIN which administratively is an institute affiliated to ETH, who designated SIN as the inviting institution for the conference and allowed us to solve the allimportant financial problem. I wish to thank Minister Burckhardt, President of the Board, represented here by Mr. von Wurstemberger, for his support.

We have the privilege of holding our conference in the beautifully equiped physics buildings of the Hönggerberg campus of ETH Zürich. I wish to thank warmly Professor Ursprung, President of ETH Zürich, for his kind hospitality in these remarkable conference facilities reminding of only recently passed times where support for science was plentiful indeed.

The fear, sometimes mentioned in discussing the opportunity of continuing this series of international conferences on cyclotrons, that the field may be diminishing in interest is clearly eliminated when one sees the great number of papers submitted to this conference. Because the responsible committees felt that conducting parallel sessions would be unfortunate and also wishing to have important subjects rather treated by invited speakers, only a rather small fraction of the announced contributed papers could be accepted for oral presentation. We felt that the recently introduced poster sessions would provide an adequate alternative. In this difficult selection procedure some arbitrariness unfortunately could not be avoided and the Scientific Program Committee hopes for the kind understanding of the authors.

In these times calling for social relevance of scientific activities it is very fortunate to see the important part taken in this conference by applications. Facing a growing distrust of everything 'nuclear', the vigorously growing collaboration in the field of medical applications seems very beneficial for both sides and worth a considerable effort on the part of the machine builders to understand the needs of our medical colleagues.

Before closing, I have to extend further thanks to two institutions who greatly helped in organising the conference. First our predecessors, our friends from Triumf, who provided us with a lot of extremely useful information about the pitfalls associated with such undertakings. Let me ask Professor Richardson to forward our thanks. Secondly we are indebted to Dr. Michaelis to have made available to us the enormous experience of CERN in publishing proceedings.

Before I turn over the conference to the chairman of the first session, I would like to ask Professor Staub to say a few words to the audience on behalf of I.U.P.A.P. who has kindly sponsored our conference.

Let me now close by wishing you a delightful and stimulating week.

WELCOME ADDRESS

H. Staub, IUPAP

As chairman of the Swiss National Committee of the International Union of Pure and Applied Physics, I have the honour to welcome you on behalf of the Union to the 7th International Conference on Cyclotrons and their Applications.

I wish to express our satisfaction that the organizers of the conference have asked for the Union's sponsorship, although this engagement comprises always only a small financial assistance. It is therefore gratifying for the Union that its help in organizing and coordinating scientific conferences, as it has been done now for more than 50 years, is still appreciated by the scientific community.

May I, as one of the senior participants take the liberty of adding two remarks to the Union's welcome. First I would like to draw your attention to the fact that there is a long and close association of cyclotrons with the Laboratory of the Federal Institute of Technology in Zurich. If my memory is correct, Zurich was the second European laboratory to be equipped with a cyclotron in 1938, when Paul Scherrer installed a machine very similar to that which the Joliots shortly before had obtained for the Paris laboratory. It was in operation until the middle of the fifties and might to a certain extent to considered the precursor of the present SIN machine.

Personally, I look very much forward to hearing about the latest developments in the construction of cyclotron machines, since exactly 35 years ago I built with my colleagues at Stanford University a cyclotron for accelerating 50 μA of deuterons to an energy of 2.5 MeV.

As it still is nowadays, one of the hard problems was the financing of the enterprise. For the magnet and other large parts of equipment, which could not be built in the laboratory workshop, we had to raise 5'000 dollars, which at that time was quite a large sum and which we finally obtained from various foundations and through private contributions. Fortunately, the machine turned out to be very successful, and I was highly pleased to learn that it is still in operation in the teaching laboratory of a midwestern college in the United States.

With this second remark, I intended to demonstrate the awe inspiring scale at which the cost of accelerators rise with power and energy, and as time goes on, the financial problems might become more difficult to solve than even sophisticated technical questions.

Concluding, I wish you in the name of IUPAP a successful and enlightening conference.