

No evidence for S^0 meson

In contrast to our usual practice of announcing new candidates for the ever-growing list of identified particles, we can report this month an experiment at CERN which indicates that one of the particles whose existence has been accepted for the past two years can be crossed off the list.

The particle concerned is the S^0 meson of mass 730 MeV. Its importance lay not only in the obvious interest of a newly identified particle but in the fact that its existence seemed to remove a strange anomaly observed in the behaviour of the rho (ρ) meson. The ρ meson, of mass 760 MeV, is a two pion resonance and can exist in neutral and in positive and negative charged states. Experiments have investigated the decay of the ρ into two pions. For the charged states, a forward-backward asymmetry over the mass width of the ρ , in the angular distribution of the pions, is observed, which changes sign,

passing through zero at the mass value corresponding to the ρ peak. For the neutral ρ , however, the asymmetry remains practically constant over the mass width.

This could be explained by the existence of other neutral mesons, decaying into two pions, of mass very close to the ρ which interfere with the ρ decay so that, although the ρ^0 may actually behave in the expected manner, the fact that decays of other neutral mesons are being observed at the same time, results in an apparent constant value for the asymmetry. A counter experiment, carried out in 1965, reported the observation of a neutral meson, named S^0 , with a mass of 700 MeV, which seemed a possible explanation of the ρ^0 anomaly.

The present CERN experiment (see page 65) needed to survey the mass region around the ρ mass in preparation for their investigation of electromagnetic decays of neutral mesons. The experimental team (a Bologna-CERN collaboration) * consisted of A. Buhler-Broglin, P. Dalpiaz, T. Massam, F.L. Navarria, M.A. Schneegans, F. Zetti and A. Zichichi. They used a negative pion

beam of momentum 1.52 GeV/c onto a hydrogen target (10 cm long, 4 cm diameter) and calculated the missing-mass of the neutral meson by time of flight measurements (accurate to ± 0.3 ns) on the neutron produced in the interaction.

The neutron detector is placed 4 m from the target at an angle of 20° to the pion beam direction and consists of 12 plastic scintillation counters, each $100 \times 18 \times 18$ cm³. Each counter is viewed by two photomultipliers, one at each end, to give the momenta and positions of the neutrons. The angular acceptance of the counter array is 14° . Using a special counting technique, the experimental team were able to record, in narrow time intervals, neutrons with a wide spread angular distribution. This technique has made it possible to carry out measurements so far without the use of a computer.

The arrangement enabled the previous counter experiment, which claimed the observation of the S^0 , to be precisely repeated. About 150 events corresponding to the well-established omega (ω) meson were observed and on the basis of this figure

Some of the equipment for the experiment, S 51, which will look for the electromagnetic decays of neutral mesons. The neutron detector, used in the preliminary investigation which showed no evidence for the S^0 meson, is on the left. The array of twelve large plastic scintillation counters can be identified by the white rectangular marks on the ends of the counters.



A large magnet being lowered down to the underground beam-line which will take protons from the synchro-cyclotron to the ISOLDE laboratory. The photograph was taken during the two week shut-down of the SC in April, which was principally for the installation of this beam-line.



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some 350 to 600 events corresponding to S^0 should have appeared in the course of the experiment. In fact the results showed no evidence for the existence of the S^0 and we are left with the anomaly of the ρ behaviour.

Molecular Biology Conference

The European Conference on Molecular Biology, convened and organized by the Swiss government, was held at CERN from 4 to 6 April, under the presidency of Mr. Olivier Reverdin (Switzerland). Representatives from 16 countries (the thirteen Member States and the three Observer States of CERN) attended the conference and eight international organizations also sent observers.

During the opening session, Mr. Willy Spühler, Conseiller fédéral and Chef du Département politique suisse, gave the address of welcome to the delegates. He said that he was convinced of the high interest of molecular biology not only for

The opening session of the European Conference on Molecular Biology on 4 April in the CERN Council Chamber. The President, Mr. Olivier Reverdin, on the right, is addressing the delegates. On the left is Professor Gregory and in the centre Mr. Willy Spühler.



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the scientists themselves but also for the whole of humanity. He defined molecular biology as 'giving meaning to the phenomenon of Life at the level of molecules constituting living cells'. He concluded by saying that the Swiss government had decided to call the conference to give those European countries who wished to make a combined effort in this field of fundamental research, the chance to review the situation and to examine the possibilities of co-operation.

Professor Gregory, Director General of CERN, said that the presence of representatives from the Member States and Observer States of CERN was a good augury for the success of the conference. The existence of EMBO, an organization set up by many of the leading molecular biologists in Europe, indicated the enthusiasm of the scientists to form an international organization. In molecular biology, as in other fields of science, it was vital to preserve research in the universities and to maintain the balance between research and teaching.

In conclusion, Professor Gregory said

that if the decision was taken to set up a European Laboratory for molecular biology there would be real value in placing it in the neighbourhood of CERN. Such a decision would be warmly welcomed by the European Organization for Nuclear Research.

During the conference, which was held in closed session, a broad exchange of views led to the conclusion that the states represented were conscious of the importance of molecular biology and of the desirability of fuller European co-operation in this field. The conference also recommended that the European governments ensure the continuation and development of EMBO. This organization was invited to pursue its studies into what might become a European Molecular Biology Laboratory, the creation of which EMBO had recommended.

A second European Conference on Molecular Biology will be held before the end of the year. In the meantime a working group will prepare the draft of an appropriate structure for European co-operation.

The CDC 6400 computer arriving at Cointrin airport on 30 March. The main installation work at CERN was completed over the following few days and commissioning of the computer began on 3 April; this represented a gain of about two weeks over the original schedule. Prior to its dispatch from Minneapolis the 6400 was submitted to the stringent CERN reliability test and showed a reliability of 98.5%.

The Austrian Minister of Education, centre, sees the proton synchrotron ring during his tour of the Laboratory on 7 April.

Below: A group of Swiss Members of Parliament, visiting CERN on 13 April, listen to an explanation of an experiment (S 52) at the proton synchrotron.



Photo Interpresse

Visits to CERN

Two important groups of visitors were welcomed at CERN in April.

On 7 April, Dr. Theodor Piffel-Percevic, the Austrian Minister of Education, accompanied by several other senior Austrian officials including Dr. R. Martins, the Ambassador to the United Nations at Geneva, and Dr. W. Kummer and Dr. W. Thirring who have represented Austria as delegates to the CERN Council, visited CERN. They toured the site meeting many Austrian scientists working at the Laboratory. The Director General, Professor Gregory, and other senior members of the staff discussed the present research programme and the future of sub-nuclear physics in Europe, with the Austrian officials.

On 13 April, twelve members of parliament from the Swiss Finance Commission, led by Mr. F. Hayoz (President) and Mr. A. Kaiser (Secretary) visited CERN. They were accompanied by Professor U. Hochstrasser, Swiss delegate for atomic affairs

and Mr. E. Valloton, Swiss delegate to the CERN Council.

Professor L. Van Hove welcomed the visitors, in the absence of the Director General, and spoke to them of the present and future work of CERN and of the part played by Switzerland in this work.

The visitors toured the main areas of interest in the Laboratory and spoke to Swiss scientists and engineers working at CERN.

Concerts

The series of concerts of classical music organized jointly by CERN and the Geneva studio of the Swiss Broadcasting Service began with a very successful evening on 6 April. The Michel Corboz Vocal Ensemble from Lausanne was acclaimed by a large and enthusiastic audience in the CERN Main Auditorium.

Two concerts remain in the series: 18 May: Brigitte Buxtorf (flute), Catherine Eisenhoffer (harp) will present a programme including compositions by Fredrick the



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Great, Bach, Inghelbrecht, Roussel and Debussy.

1 June: Stephan Romascano (violin), Ron Golan (viola), Edgar Fischer (violin/cello) and Denise Dupont (piano) will interpret works by Schubert, Hindemith and Schumann.

Conferences

The 1967 CERN school of physics will be held at Rättsvik in Sweden from 21 May to 3 June. This is the sixth in a series of courses organized by CERN for young experimental physicists in Europe.

Colloquia

The following colloquia will be held in the CERN Main Auditorium.

18 May: Professor M. Fierz from E.T.H. Zurich will talk about 'Newton's Mechanics'. 25 May: The speaker will be Professor K.H. Krebs from Ispra; the title of his talk is not yet available.