

Another new resonance

A paper published in *Physics Letters* on 15 February (vol. 14, p. 338) under the names of 30 physicists from the Universities of Birmingham, Glasgow, London (Imperial College) and Oxford, together with the Rutherford High Energy Laboratory, gives the results of an analysis of 300 000 photographs taken with the Saclay/Ecole Polytechnique 81-cm liquid hydrogen bubble chamber at CERN in 1963.

The photographs showed interactions in the hydrogen caused by negative kaons of momentum 3.5 GeV/c and, in the results reported, those interactions giving a neutral antikaon, a negative pion and a proton (reaction: $K^- + p \rightarrow \bar{K}^0 + \pi^- + p$) had been selected — a total of 339 events.

From measurements made on the selected photographs, the physicists concluded that the most common way in which the reaction took place was through the 'peripheral' production of a well-known kaon resonance (K^*) with a mass of 890 MeV, this resonance then decaying almost immediately into the $\bar{K}^0$ and the π^- . Other common resonances were not in evidence, but a hitherto unobserved state with a mass of 1400 MeV (± 10 MeV) was found to be present. This also decayed into a neutral antikaon and a negative pion. The new resonance has an observed

'width' of about 160 MeV, corresponding to a lifetime of about 10^{-20} second. A detailed analysis of the events leads to the result that the spin and parity are more likely to be 2^+ (that is, a spin quantum number of 2 with positive parity) than 1^- , with 0^+ ruled out. Although the resonance was not observed by other groups in a similar experiment (also at CERN) using incident kaons of 3 GeV/c momentum, this is thought to be due to the slightly lower energy available in that case.

Italian Diplomat visits CERN

On Wednesday 3 February, CERN was visited by H. E. J. Giusti del Giardino, Head of the Permanent Delegation of Italy in Geneva, together with two other members of the Delegation. The visitors, who were accompanied on their tour by one of the senior Italian physicists at CERN, were shown both the Organization's accelerators, together with experiments in progress in the East and South halls of the proton synchrotron. The 2-metre bubble chamber was also visited, and some time was spent discussing the future projects under study in the Accelerator Research Division. The tour ended with a view of the CERN facilities for measuring and analysing bubble-chamber photographs, including the large new computer now being brought into operation ●

CERN/PI 48.2.65



With a storage ring for electrons in operation, and those for protons under active discussion, CERN is also constructing a storage ring for muons.

Essentially, this will consist of a large circular magnet, about 5 metres in diameter, in which high-energy muons produced in a vacuum tube inside the magnet will make many revolutions during their lifetime. Appropriate measurements on the decay electrons will enable the anomalous magnetic moment ($g-2$) of the muon to be evaluated to a much higher order of accuracy than before.

In this photograph, one of the excitation coils for the new storage-ring magnet is seen leaving CERN's main workshop on its way to the South experimental hall of the proton synchrotron, where the magnet will be assembled. Driving the transporter is Maurice Cartier and Maurice Chatel steadies the coil. In the background is the new laboratory 13 of Track Chambers Division.

BOOKS

Tracking down particles, by R. D. Hill and E. Gerjuoy (New York, W. A. Benjamin Inc., 1963; cloth \$5.45, paper \$3.25).

The Benjamin series to which this book belongs is intended principally for elementary students of science and provides introductions to each of a number of important fields. Non-scientists may also use these books in order to gain familiarity with the various subjects treated, though it is clear that the series is not specifically aimed at them.

This book is about high-energy physics and its authors have attempted to make it easier to read by dividing it into two parts. Thus there is first a systematic account of the most important discoveries, techniques and developments in this field, written by R. D. Hill, and this is followed by an analysis of the theoretical background, including an explanation of the basic relevant differences between classical and modern physics, by E. Gerjuoy, who is also the general editor of the series.

It is, of course, possible to justify a treatment of this kind, though it has the serious disadvantage, for the reader with little time to spare, of requiring at least two readings

before the book is fully understood. Since this is an introduction to the subject, rather than a detailed textbook, it would surely have been much simpler to raise the various theoretical issues while developing the main theme: particles and the means by which they are discovered.

Apart from this drawback, this is a lively and interesting summary of the present state of knowledge in high-energy physics. It is also a useful contribution to wider understanding of a field that, regrettably, remains inaccessible to all but a few initiates.

There are many diagrams and photographs, and the book is provided with an adequate index, a glossary and a world list of accelerators.

M.J.O.S.

Nuclear reactor theory, by Giovanni Lanza (London, McGraw-Hill Ltd., 1964; 39s.).

This book is the fifth in the series *Nuclear engineering fundamentals*, of which the other four deal with 'Atomic

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physics’, ‘Nuclear physics’, ‘Interaction of radiation with matter’ and ‘Nuclear materials’. Each book forms a separate entity, though there is some cross-referencing between them.

As stated in the preface to the current volume, the series is aimed at people who, while not themselves physicists or engineers, have an interest in nuclear physics and engineering. As a consequence the present volume contains little that is new for a qualified physicist.

Mathematical passages that are assumed difficult for the type of reader in mind are clearly marked and it is easy to follow the text leaving out these sections. A wide field is covered in relatively few pages and the coverage given to each topic is naturally limited, so that it is unfortunate that at least a general list of references was not given. The first three chapters do contain a few ‘examples’ at the end, but references to other publications would probably have been of more value.

Two interesting chapters in the book have been contributed by different authors. One of these, ‘Sanitary engineering aspects of radioactivity’, by Kenneth R. Read, deals with the problem of radioactive waste, its absorption in special materials, and its disposal. The second, by George P. Sutton, entitled ‘Nuclear reactors in aviation’, devotes about twenty pages to the ideas and the problems concerning the use of nuclear reactors in aviation and in space research.

As a guide to the prospective reader, the following list of the remaining chapter headings may be useful, although

the detail covered in any particular topic is, as mentioned above, rather limited.

- Basic concepts of reactor theory;
- Neutron physics;
- Nuclear reactor theory I: collision theory;
- Nuclear reactor theory II: slowing-down theory;
- Nuclear reactor theory III: diffusion theory;
- Reactor design;
- Reactor control;
- Reactor safety and shielding;
- Purification of foods by atomic radiation.

Many books have been written at this level on various aspects of nuclear physics and nuclear engineering. This particular one is characterized by the fact that it does try to explain some of the theoretical concepts involved in reactor technology.

J. R. Sherwood

Also received :

Nuclear orientation, edited by M. E. Rose (New York, Gordon and Breach Science Publishers Inc., 1963 ; \$ 4.95)
— a volume in the publisher’s *International Science Review Series*, providing a collection of reprints of representative papers dealing with the theory, observation and detection, and applications of nuclear orientation.

Point defects in metals, by A.C. Damask and G.J. Dienes (New York, Gordon and Breach Science Publishers Inc.,

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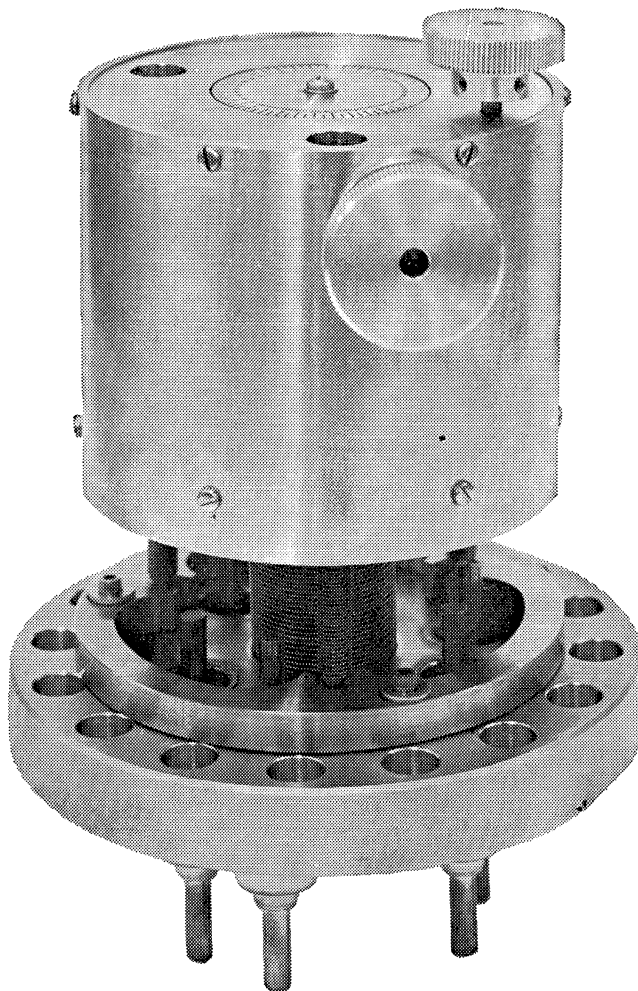
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1963; \$19.50, 'Professional edition' \$9.50) — presents the theoretical and experimental methods employed in investigating these crystalline irregularities of atomic dimensions which play a central role in the interpretation of many physical properties and processes in solids.

Atlas and tables for emission spectrographic analysis of rare-earth elements, by Ch. Kerekes (Oxford, Pergamon Press Ltd., 1964; £5) — tabulates analysis lines in order of decreasing wavelength, with interfering lines of other rare earths, scandium and yttrium; atlas shows positions of lines with respect to iron spectrum.

Göttinger Atomrechtskatalog: Atomic-energy law — part I, Laws and regulations, treaties, vol. 8, Denmark-Gabon (Göttingen, Institut für Völkerrecht der Universität Göttingen, 1964) — latest in series intended to show all provision of atomic-energy law emanating from International Organizations and States and international agreements dealing with non-military uses of nuclear energy; titles in original language, or language considered to be most frequently used, and in German, English, French.

Nuclear structural engineering, editor T. Jaeger (Amsterdam North Holland Publishing Company, Vol. 1, No. 1, January 1965; \$25.00 per volume) — new journal, to be published every two months, devoted to civil, mechanical and chemical structural engineering problems of nuclear power plants, radiation facilities, radioactive waste; although primarily concerned with nuclear engineering, some of the contents could be of interest to accelerator builders and users ●

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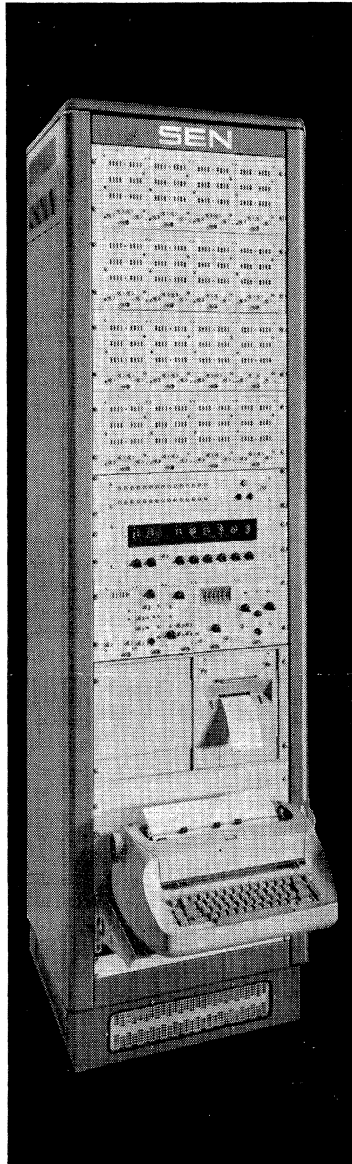
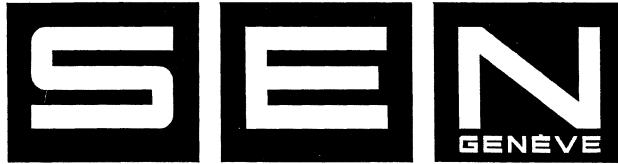
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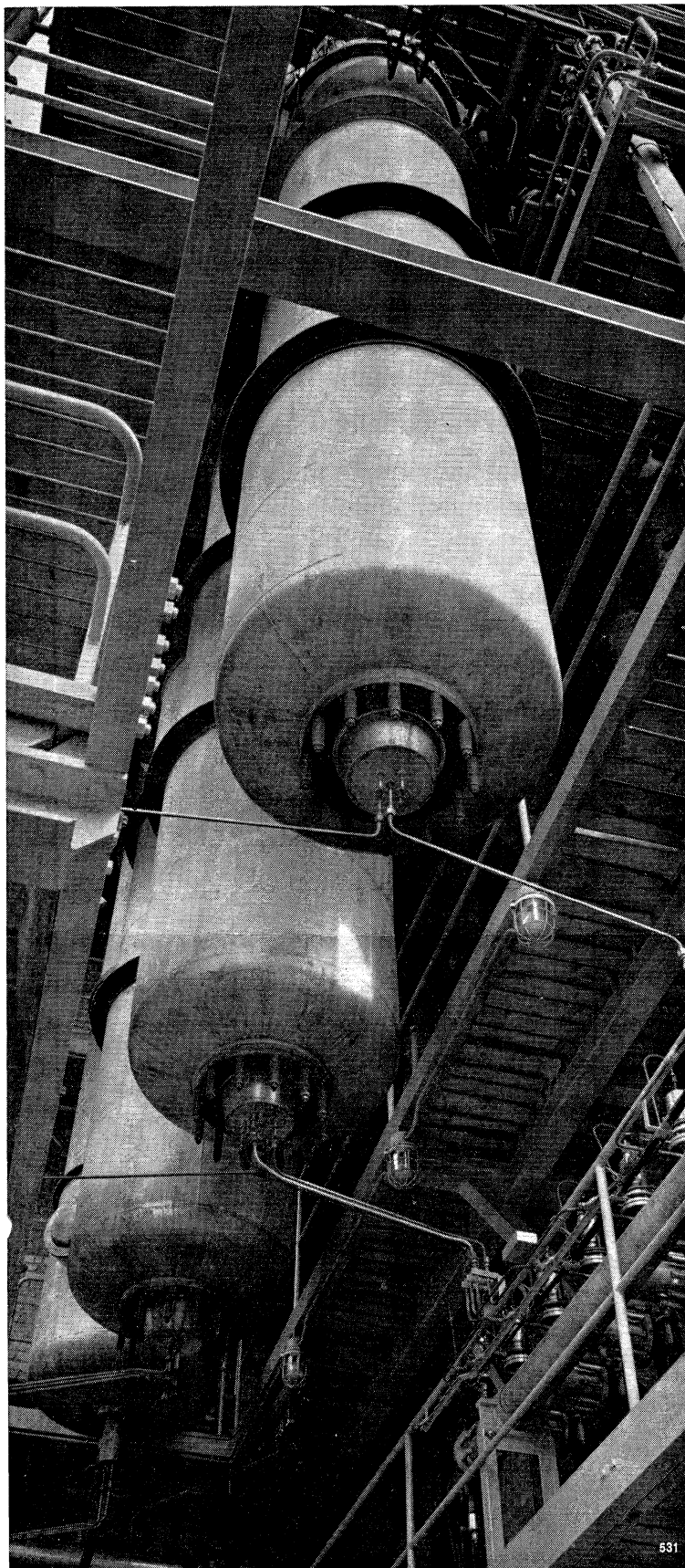
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