Rutherford Laboratory

18 November 2 December 1974

bulletin 23

EXCITING NEW PARTICLE DISCOVERED

FROM STANFORD CALIFORNIA NOVEMBER 12 1974 ..... ATTN DR G MANNING

SPEAR SEEN HUGE SPIKE IN ELECTRON POSITRON TO HADRONS AT 3.105 GEV CENTER OF MASS ENERGY STATE VERY NARROW, LESS OR EQUAL 1.3 MEV FULL WIDTH HALF MAX ..... TING AT BNL REPORTS PP TO E PLUS E MINUS PLUS ANYTHING, ALSO SEES SPIKE AT SAME MASS, WIDTH LESS OR EQUAL 5 MEV THEIR RESOLUTION ..... INTENSE EXCITEMENT HERE, REGARDS, GORDON RINGLAND.

On Tuesday 12 November the drums began to beat out a story of the discovery of a new particle at the Brookhaven National Laboratory, USA. Late the same afternoon a 'phone call from CERN to the Editorial Desk confirmed the story and gave a firm figure for the centre of mass energy of 3.1 GeV. By the next morning, Telex messages had been received corroborating the previous information and adding SPEAR figures to the story. Part of the TELEX from Gordon Ringland is reproduced above. Gordon, a member of our Theory Division is on long term attachment at SLAC (Stanford Linear Accelerator Center).

From the various 'particles' of information received to date, Bill Toner (Nimrod Division) has put together the following report:

Professor S C C Ting and his colleagues working at Brookhaven have been measuring the production of electron positron pairs in the reaction proton + proton → electron + positron + anything else, using the Brookhaven extracted proton beam. They have found 500 events in which the electron positron pairs have the same mass - 3100 MeV - to within the 5 MeV resolution of their apparatus, and no events at nearby masses, indicating the production of a new particle.

Professor B Richter and his colleagues at SLAC working with the electron-positron storage ring SPEAR find that at precisely 3105 MeV (within uncertainties equal to Ting's value), there is an enormous peak in the cross section for electron + positron → hadrons and related effects in the production of muon pairs and in electron positron scattering. The hadronic cross section is more than 100 times larger than it is at nearby energies. The width of their peak is equal to the experimental resolution of 1.3 MeV.

So many particles have been discovered in the last twenty years that another more or less might not seem something to get excited about. This one is so remarkable in its properties however, that the explanations being advanced range from the bizarre to the fantastic. "Normal" particles of mass around 3000 MeV are very unstable and decay rapidly into lighter particles. Because of the uncertainty principle this results in a large "width", typically several hundred MeV. Since the width of this particle is very much smaller, it lives very much longer.

Why? What stops it decaying? Your guess is as good as ours. What is sure is that this is a major discovery requiring a qualitatively new explanation, possibly a new quantum number.

RUTHERFORD LABORATORY LECTURE

As a complete contrast to the two previous lectures in this series, the work of the Medical Research Council will be discussed in the lecture to be given by Sir John Grey, FRS, Secretary to the MRC, in the Lecture Theatre at 15.15 on Thursday, 28 November.

Sir John was educated at Cheltenham College and Clare College Cambridge. After several years at University College Hospital he joined, in 1943, an MRC Research Unit carrying out Service research and in 1945 as a Surgeon Lieutenant RNVR worked under the Scientific Direction of the MRC in the fleet. 1946 saw him back as a member of the MRC Scientific Staff first at Hampstead and later at Mill Hill. However in 1952 he re-entered the UCL Physiology Unit becoming Professor of Physiology in 1959.

Sir John returned to the MRC in 1966 as Second Secretary moving to his present position of Secretary in 1968; he was knighted in 1973. Sir John is a Member of the Advisory Board for the Research Councils.

The title of his lecture is "Fundamental Science and the Solution of Health Problems" and he has kindly supplied the following summary:

The MRC spent £m30 in 1973/74 and operates through its own staff and through grants. Its purposes are to support science in its field and to promote research related to specific objectives. The lecture will try to illustrate how these roles interrelate and how fundamental research leads to practical results in the medical field. Examples with a significant component of non-biological science will be chosen.

INTERNAL EVENTS

NIMROD LECTURE SERIES
Monday 18 November
11.30
Lecture Theatre

Results on Electroproduction in Exclusive Channels.

Dr G Wolf/DESY

TRADE SEMINAR IN COMPUTING
Tuesday 19 November
15.15
Conference Room, Building R12

ECLIPSE, the Latest Generation of Compact Computers

R Kissach/Data General Ltd

This talk will describe the features incorporated in the latest generation of compact computers which the ECLIPSE represents, features previously found only in large computers, for example semiconductor memory with cache, error checking and correction hardware and self optimising software which illustrate the ever increasing performance in this fascinating area.

HEP SEMINAR
Wednesday 20 November
11.00
Lecture Theatre

Reggeon Parameters from Duality and Unitarity.

J E Paton/Oxford

SEMINAR IN COMPUTING
Friday 22 November
11.00
Conference Room, Building R12

Report from SEAS 1974

Members of the C & A Division who recently attended the SHARE European Association (SEAS) annual conference in Zurich will talk about particular aspects of a selection of the seminars. They will also report on aspects of the work being done by SEAS Project Committees, e.g. OS Committee and Fortran Committee.

(SEAS is a European association of users of IBM equipment).

NIMROD LECTURE SERIES
Monday 25 November
11.30
Lecture Theatre

The Physics Programme at FNAL.

Dr R M Brown/RL

ELECTRONICS GROUP SEMINAR
Tuesday 26 November
09.30
Conference Room, Building R12

Data Acquisition from Fusion Experiments at Culham.

E G Murphy/Culham

HEP SEMINAR
Wednesday 27 November
11.00
Lecture Theatre

Reggeometry.

G Cohen-Tannoudji/Saclay

RUTHERFORD LABORATORY LECTURE
Thursday 28 November
15.15
Lecture Theatre

Fundamental Science and the Solution of Health Problems.

Sir John Gray/Medical Research Council (see 'News' for details)

NIMROD LECTURE SERIES
Monday 2 December
11.30
Lecture Theatre

A Partial Wave Analysis of the $K\pi\pi$ System in K^-p Interactions at 14.3 GeV/c.

S Tovey/RL

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Deadline for Insertions	GENERAL & SOCIAL NEWS: Tuesday 1600	INTERNAL & EXTERNAL EVENTS: Wednesday 1200
		Abingdon 1900 Ext 484

EXTERNAL EVENTS

OXFORD UNIVERSITY

THEORETICAL PHYSICS SEMINAR/CLARENDON LAB - 16.15 hours
28 Nov: The Fuss about Electron-Positron Annihilations at High Energies-Prof Dalitz/Oxford.

THEORETICAL ELEMENTARY PARTICLE PHYSICS SEMINARS/NP DEPT - 14.20 hours
22 Nov: The Melosh Transformation - A Critical Review of its Theoretical and Experimental Status - Dr A J G Hey/Southampton.
29 Nov: Magnetic Charge - No Strings Attached - Dr E F Carter.

ELEMENTARY PARTICLE PHYSICS SEMINAR/NP DEPT, Keble Road - 14.30 hours
21 Nov: How to Search for Charmed Particles - Dr C Llewellyn Smith.

COLLOQUIA/CLARENDON LAB - 16.15 hours
22 Nov: Elementary Particles at Very High Energies - Prof. P G Murphy/Manchester.
29 Nov: Can NQR Help Biologists - Dr D T Edmonds/Clarendon Lab.

NUCLEAR STRUCTURE SEMINARS/NP LAB - 14.30 hours
25 Nov: Heavy Ion, Transfer Reactions - Dr S Kahana/Brookhaven and Oxford.
2 Dec: Nuclear Structure Information from Inelastic Electron Scattering-Dr Johnstone/Kelvin Lab.

QUEEN MARY COLLEGE

THEORETICAL PHYSICS SEMINARS/Physics Lecture Theatre - 16.15 hours
25 Nov: Scattering with Marge Momentum Transfer - Dr P V Landshoff/Cambridge.
2 Dec: Renormalisation Group & Critical Phenomena - Dr J M Kosterlitz/Birmingham.

KING'S COLLEGE

NUCLEAR PHYSICS GROUP SEMINAR/Room 129 - 14.00 hours
27 Nov: Heavy Ions in Nuclear Structure Physics - Prof. G Morrison/Birmingham.

MANCHESTER UNIVERSITY

THEORETICAL PHYSICS SEMINARS/Niels Bohr Common Room - 14.30 hours
20 Nov: The Application of R-Matrix Theory to Atomic Physics - Prof P G Burke/Belfast.
27 Nov: Molecular Beam Reactive Scattering - Dr R Grice/Cambridge.

SOUTHAMPTON UNIVERSITY

THEORETICAL & HIGH ENERGY PHYSICS SEMINARS - 14.30 hours
22 Nov: Spinors in η Dimensions - Dr R C King/Southampton.
29 Nov: Hadronic Processes at Large Transverse Momentum - Prof J C Polkinghorne/Cambridge.

BRISTOL UNIVERSITY

PHYSICS & GEOPHYSICS COLLOQUIA/Room G12, Royal Fort - 1700 hours
18 Nov: Problems in the Foundations of Quantum Mechanics - Old and New, Solved and Unsolved- Prof L E Ballentine/Simon Fraser Univ. Vancouver.

DARESBURY LABORATORY

COMPUTER SYSTEMS & ELECTRONICS DIVISION SEMINAR - 14.30 hours
20 Nov: The Writing of On-Line Programs for Data Acquisition - D R Botterill.

DARESBURY LECTURE SERIES/LECTURE THEATRE - 14.00 hours
19 Nov. Experimental Results on Electroproduced Exclusive Channels - G Wolf/DESY.

THEORETICAL PHYSICS SEMINAR - 14.00 hours
25 Nov: Exchange Mechanisms in rho, photo - and Electroproduction - A Irvine/Liverpool.

HARWELL

NUCLEAR PHYSICS DIVISION SEMINAR/CONFERENCE ROOM H8 - 15.30 hours
21 Nov: Tracer Techniques in Industry - Dr G V Evans/N.P.D.

NIMROD SCHEDULE

9 12 26.11.74 - 22.12.74

CYCLES 11 ~~12.11.74 - 5.12.74~~ MACHINE PHYSICS HIGH ENERGY PHYSICS

Team	Beam	Experiment	State
RUTHERFORD LABORATORY	π11	Beam Measurements	Tests
IMPERIAL COLLEGE/RL	π8A	Experiments on Narrow Bosons X^0 (958) S^* and Cross-Section Measurements	Data
BEAM DETECTOR GROUP	K15A	Parasitic Running	Tests
COUNTER GROUP B/ CAMBRIDGE UNIVERSITY	π12	$\pi^- p \to K^0 \Lambda^0$ in the Range 1.4 - 2.0 GeV/c	Data
RUTHERFORD LABORATORY	π9	Polarisation in the $\pi^- p \to \pi^0 n$, nn	Data
BIRMINGHAM/SURREY/RL	K17	Study of X-rays from $K^- p$ Atoms	Data ~~Setting up~~
CERN/ORSAY/OXFORD	P81	Parasite running (< 5% total beam) off from 1/12/74	

LIBRARY OPENING CEREMONY

The official opening of the new Library will take place at 12.30 pm on Tuesday 26 November. Dr T G Pickavance, the first Director of the Rutherford Laboratory, will officially declare the Library open, in the presence of members of the Nuclear Physics Board who will be visiting the Lab for a Board meeting. The Library will be closed from 11.00 - 13.30 on that day.

NUCLEAR PHYSICS BOARD MEETING

Certain exhibits have been arranged for the visit of the Nuclear Physics Board on Tuesday 26 November. They are:-

1. Nuclear Physics Apparatus (R12 Experimental Area)
2. $\pi^- p - \Lambda^o K^o$ Experiment (π12 Beam Hall 3)
3. Stopped K Experiment (K17 Beam Hall 3)
4. Radio Biological Work (π11 Beam Hall 3)
5. New Injector
6. EPIC - thoughts on site layout and arrangement of machine

These exhibits will be open on the afternoon of Tuesday 26 November for any member of staff who wishes to see them.

THE RL ON BBC TV

Some time ago a BBC Horizon film unit paid a visit to the Laboratory. It is hoped to see the result of this visit when on Monday evening 25 November the Horizon programme is shown on BBC2. The title of this particular edition is "The Greatest Advance Since the Wheel?" According to the Producer, the question mark is a very important part of the title!

MAIL - TO FRANCE

Due to strike action in France the delivery of all postal mail to France is suspended and the Post Office has requested people not to post mail for that country until the service is operating again. At present all UK mail recently posted to France is being held by the British Postal Service but there is a limit to their storage facilities. One letter is being held in Rutherford/Atlas Post Room addressed to SFAT, Depot Electronic, Paris, the sender may like to retrieve it and if necessary send it by an alternative method.

- TO NORTHERN IRELAND

The Post Office are now not accepting parcels for Northern Ireland. This ban will probably last until after Christmas.

MISSING EQUIPMENT

The following item of equipment has been reported missing from the π12 local control room since about 1/11/74.

Asahi Pentax Takumar f1.8 Lens

Anyone knowing of its whereabouts please contact T A Broome or B T Payne Ext 6343.

FILM BADGE NOTICE

It is Period 12. Colour Strip - RED for $\beta\gamma$ films and neutron packs. Please check that you are wearing the correct dosimeters and that all old ones are returned. Any person requiring a new $\beta\gamma$ holder please contact Mrs Coates, G4A, R2, Ext 430.

TRANSPARENCY MAKER

A machine for making transparencies for use on overhead projection is now installed in Mr P B Nicholls Office, Room 2.76, R1.

OVERSEAS VISITS

Mr R O Butt, to CERN, 17-22 November for discussions on computerized adminstration functions at CERN.
Mr J Penfold, to ILL, 18-29 November, for implementation of "BASIC" on the D3 software
The Director, to CERN, 21-22 November, to meeting of "Groupe Teillac".

SOCIAL NEWS

ADMINISTRATION DIVISION DANCE

This will be held in the Laboratory Restaurant on Saturday, 7 December - music by "The Goodtymes" - proceeds to the Rutherford & Atlas Recreational Society. Tickets priced £1.00 (buffet supper included) are obtainable from:-
Val Goodwin - R1; Jeff Rouse - R2; Peggy Shipley - R12; Myra Gilbert - R20; Jill Keats-Atlas
Coach Travel from Abingdon & Drayton will be arranged subject to demand - approx cost 40p each for 30 passengers. If interested, contact Bob Pepperell, R20 Ext 419.

CHRISTIAN FELLOWSHIP

Friday 22 November. This meeting, at 12.30, R12 Conf Rm, will take the form of discussion about the previous weeks subject entitled - "God's Covenant with Abraham".
Friday 29 November. All welcome to a talk entitled "Me and My Neighbour". Mrs Joannie Yoder, an American who is at present living in Reading and doing some missionary work in Finland has, over the past years been instrumental in the formation of several home Bible Study Groups. How do these function and what results do they bring are some of the questions which will be answered. Usual time and venue. All welcome.

REC SOC

The AGM is on Wednesday 11 December at 13.00, Conf Rm, R12.