Rutherford Laboratory

2-16 December 1974

bulletin 25

THE ASSOCIATED PRODUCTION SPECTROMETER - APS

The Associated Production Spectrometer, APS, has just started its first experiment at Nimrod in the π12 beam line in Hall 3. It is the biggest detection system yet built by the Nuclear Physics Apparatus Group and the HEP Electronics Group for use at Nimrod. It has been designed for a series of experiments on the so-called associated production reaction $\pi^- p \rightarrow K^o \Lambda^o$ using pion beams in the energy range 1-4 GeV incident upon liquid hydrogen targets and polarised proton targets.

The neutral particles, K^o and Λ^o, produced by the reaction are detected by observing their charged decay modes $K^o \rightarrow \pi^+ \pi^-$ and $\Lambda^o \rightarrow p\pi^-$ giving the characteristic signature for the reaction of two vees. The charged secondary particles are observed in large optical spark chambers (1.20m x 1.20m and 2.20m x 2.20m sensitive areas) viewed by four lead oxide vidicon cameras on-line to a DDP516 computer. A double M5 spectrometer magnet followed by an array of magnetostrictive wire spark chambers downstream measures the energy of those particles within the magnet's 2.0m x 0.8m aperture. Wide angle particles are caught by a time-of-flight ring, 4m diameter, of 24 scintillation counters which together with a set of 1.0m x 1.0m multiwire proportional chambers covering the magnet aperture form the basis of the trigger for the detection system. The proportional chamber system comprises 2000 wires for triggering and 1000 wires for beam measurement.

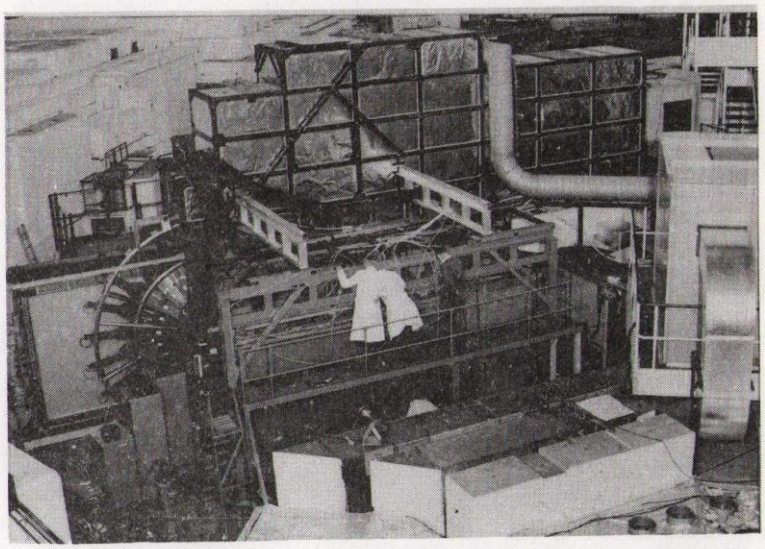

Photo - the experiment set up in Hall 3

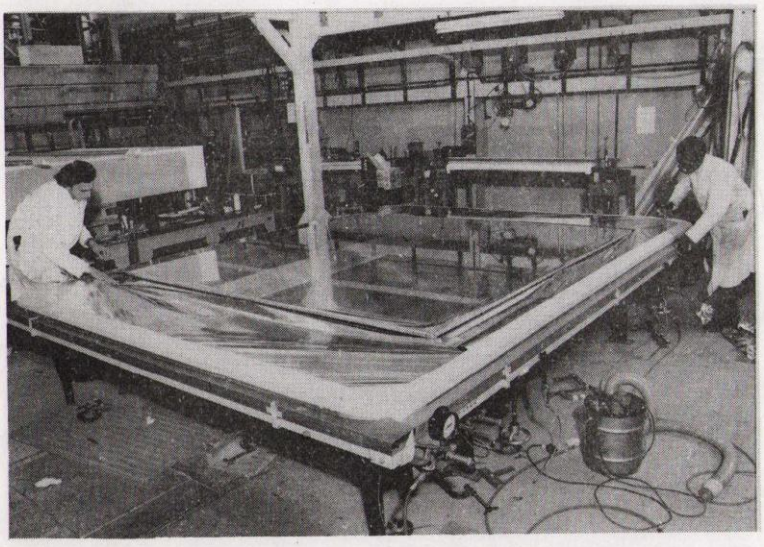

Photo - building the large spark chamber

The first experiment, proposal 114, is to measure the differential cross-section and Λ^o polarisation at 10 energies between 1.4 and 2.0 GeV. In this mode of APS running a liquid hydrogen target is used and it is surrounded by 16 low mass magnetostrictive spark chambers arranged in 4 quadrants, top, bottom, left and right. This array permits the detection of large angle K^o decays which is essential to cover the full centre of mass angular distribution of the reaction adequately. Data taking will be completed in Summer 1975 when the liquid hydrogen target and low mass chamber array will be removed and replaced by a longitudinally polarised target, PT55, designed and constructed by the Dept of Engineering Science and Applied Physics Division and at present being constructed in Building R25. This target will be used to measure for the first time the spin rotation parameters A and R in the resonance region.

INTERNAL EVENTS

NIMROD LECTURE SERIES
Monday 2 December
11.30
Lecture Theatre

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

S Tovey/RL

ELECTRONICS GROUP SEMINAR
Tuesday 3 December
09.30
Conference Room, Building R12

The Use of CAMAC at Daresbury.

A C Peatfield

HEP SEMINAR
Wednesday 4 December
11.00
Lecture Theatre

Pomeron Factorisation and ϕ Production.

G V Dass/RL

COMPUTER SEMINAR
Friday 6 December
10.30
Lecture Theatre

ACL Future Graphics Facilities

R E Thomas/Atlas Laboratory

In the first half of next year, ACL will obtain an FR80 microfilm recorder, which will eventually replace the SD 4020. This device is much more accurate, and offers a considerable number of extra features. This talk will describe the main hardware features of the FR80, in comparison with the SD 4020, and will also cover some of the software packages currently available on the 195. Some proposals for changing the software to fit the new requirements will be given. It is hoped that a discussion session will follow the talk, when users can express their own requirements, and influence the decisions taken - for example, there are unlikely to be sufficient people available to completely convert all available packages, and some user changes may thus be necessary. There is also available a micro-fiche camera to produce computer output on microfilm.

NIMROD LECTURE SERIES
Monday 9 December
11.30
Lecture Theatre

The Lamb Shift in $\pi^-\mu$ Atoms.

Dr Jasper Kirkby/SLAC

PROPOSAL TALKS
Thursday 12 December
11.00
Conference Room, Building R12

Proposal No. 141 — "Inelastic Neutrino Interactions at the SPS" - CERN/Hamburg/Oxford/Westfield/RL.
Talk by *Dr N H Lipman/RL*

Proposal No. 160 — "A Proposal to Study High Energy μ and $\bar{\mu}$ Interactions at the CERN SPS using a Hydrogen filled T.S.T in B.E.P.S and a Wide Band Beam" - Brussels/UCL/RL.
Talk by *Dr W A Venus/RL*

NIMROD LECTURE SERIES
Monday 16 December
11.30
Lecture Theatre

Y* Spectroscopy

Dr A Van Horn/RL

NIMROD SCHEDULE

CYCLES 11 & 12 26.11.74 - 22.12.74 — 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
CERN/ORSAY/OXFORD	P81	Parasite Running (<5°p total beam)	off from 1.12.74

EXTERNAL EVENTS

OXFORD UNIVERSITY

THEORETICAL ELEMENTARY PARTICLE PHYSICS SEMINAR/NP DEPT - 14.20 hours
6 Dec: Chiral Symmetry Breaking at Short Distances - Dr D Broadhurst.

NUCLEAR PHYSICS LABORATORY LECTURE/N.P DEPT - 10.00 hours
3 Dec: Energy Options for this Century and their Environmental Problems - Prof R Wilson/ Harvard.

NUCLEAR STRUCTURE SEMINAR/N.P DEPT - 14.30 hours
2 Dec: Nuclear Structure Information from Inelastic Electron Scattering - Dr A Johnstone/ Kelvin Lab.

QUEEN MARY COLLEGE

THEORETICAL PHYSICS SEMINARS/PHYSICS LECTURE THEATRE - 16.15 hours
2 Dec: Renormalisation Group and Critical Phenomena - Dr J M Kosterlitz/Birmingham.
9 Dec: Photon Statistics and Correlation - Dr E R Pike/Malvern.

MANCHESTER UNIVERSITY

THEORETICAL PHYSICS SEMINAR/NEILS BOHR COMMON ROOM - 14.30 hours
4 Dec: High Energy Reaction Mechanisms - Prof C Michael/Liverpool.

SOUTHAMPTON UNIVERSITY

THEORETICAL & HIGH ENERGY PHYSICS SEMINARS - 14.30 hours
6 Dec: The Statistical Bootstrap Approach to Multiparticle Reactions - C Hamer/DAMTP Cambridge
13 Dec: Supersymmetries - Dr D M Capper/QMC.

BRISTOL UNIVERSITY

PHYSICS & GEOPHYSICS COLLOQUIA/ROOM G12, ROYAL FORT - 1700 hours
2 Dec: Small Group Teaching in Physics - Dr P J Black/Birmingham.
9 Dec: NO COLLOQUIUM but Prof. R V Jones will deliver the A M Tyndall Memorial Lecture entitled, "The Other Way Round", at 17.15 hours in the Arthur Tyndall Lecture Theatre.

READING UNIVERSITY

PHYSICS DEPARTMENT COLLOQUIUM/SMALL LECTURE THEATRE - 1700 hours
2 Dec: Condensed Excitons - Dr T G Phillips/QMC.
9 Dec: Computer Simulation Study of Diffusion Theory - Dr M Sachdev/Reading.

DARESBURY LABORATORY

COMPUTER SYSTEMS & ELECTRONICS DIVISION SEMINAR - 14.30 hours
4 Dec: Structured Programming - T Daniels

DARESBURY LECTURE SERIES/LECTURE THEATRE - 14.00 hours
3 Dec: Experience with the Omega Spectrometer - J D Dowell/Birmingham, CERN.
10 Dec: Polarisation Measurements on Pseudoscalar Meson Photoproduction - W H Range/Liverpool.

THEORETICAL PHYSICS SEMINARS - 14.00 hours
9 Dec: Impact Parameter Structure of Multiparticle Production - B R Webber/Cambridge.
16 Dec: The Renormalisation Group & Phase Transitions - D Wallace/Southampton.

ROYAL HOLLOWAY COLLEGE

APPLIED MATHEMATICS SEMINARS
5 Dec: Lecture by Prof L P Presnyakov/Lebedev Physio-Tech-Institute, Academy of Sciences, USSR.
12 Dec: The Interaction of Electrons with Atoms - Dr J F Williams/Queen's University, Belfast.

HARWELL

THEORETICAL PHYSICS DIVISION SEMINARS/CONFERENCE ROOM, BLDG 8.9 - 14.00 hours
3 Dec: The Application of Rate Theory to Study Void Swelling in M316 Steel - Dr K Krishan/AERE.
10 Dec: A Review of the Finite Element Method - Dr J K Reid/AERE.

NUCLEAR PHYSICS DIVISION SEMINARS/CONFERENCE ROOM, H8 - 15.30 hours
5 Dec: γ-Ray Astronomy - Dr D Ramsden/Southampton.
12 Dec: High Temperature Reactors: Fuel Cycles and Economics - Mr H Gutmen/AEE Winfrith.

RUTHERFORD LABORATORY BULLETIN *Published by the Scientific Administration Group*

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Deadline for Insertions	GENERAL & SOCIAL NEWS	INTERNAL & EXTERNAL EVENTS
	Tuesday 1600	Wednesday 1200

POPPY APPEAL

The total sum collected this year in the Rutherford Laboratory was £51.34 which was an increase of £14.11½ over last year's total. The organisers send their congratulations and thanks to the collectors and the contributors. Special congratulations to Mr Ron Jamison whose collecting box held £22.10½, the largest sum ever taken out of a box from the Rutherford, AERE, Culham or MRC establishments.

FILM BADGE NOTICE

Period 13 commences Monday 2 December. Colour Strip - YELLOW for βγ films and neutron packs.

Please change your dosimeters promptly and return all old ones.

TLD change for people with surnames starting with W, X, Y and Z.

FOUND

A lighter in the new injector hall; a key in the East car park (may fit briefcase). Enquiries to Mrs S A Fones, Personnel, Ext 495.

BULLETIN NOTICE

The next issue of the Bulletin will cover a period of three weeks from 16 December to 6 January. Items for this issue to be with the Editor not later than 10.00 on Wednesday 11 December.

OVERSEAS VISITS

Messrs R J Stanhope & C N Uden, to CERN, 1 - 3 December to attend collaboration meeting of Hyperon 300 experiment.
Dr C J S Damerell, to CERN, 1 - 5 December to attend collaboration meeting on P7 experiment and work on P7 and S120 experiments.
Dr R J Homer, to CERN, 1 - 6 December, for analysis of S120 experiment.
Dr W A Smith, to CERN, 2 - 3 December, for discussions about EPIC control system.
Mr D Jones, to Brussels, 5 - 6 December, for discussions on CAMAC Symposium to be held in 1975.
Dr N H Lipman, to CERN, 12 - 19 December. to attend ν collaboration meeting.
Messrs L Phillips, K Miles & R Blatchford, to CERN, 15 - 20 December for dismantling of Muon experiment on ISR.

SOCIAL NEWS

JUST THE TICKET

The Administration Division Dance is being held in the Laboratory Restaurant on Saturday 7 December. Enjoy a lively evening's fun and exercise to the music of the "Goodtymes" - at a modest cost.
For comfort, ticket sales are restricted to 300. Tickets remaining (price £1 including supper) are obtainable from:- Val Goodwin, R1; Jeff Rouse, R2; Peggy Shipley, R12. Hurry now if you want to buy - there will be no ticket sales at the door on the night.

CHRISTIAN FELLOWSHIP

Film Show - Friday 6 December at 12.40 in the Lecture Theatre. "Hidden Treasure" - a film to show the breadth and scale of the universe - star galaxies to microscopic crystals. Every created thing has its own particular function and beauty. Against the star pictures taken through the world's largest optical telescope we consider the minute perfection of a single snow crystal. The film reminds us that no two snowflakes have ever been found alike. With pictures of crystal formations in deep limestone caves are contrasted the minute beauty of tiny desert flowers and microscopic animals and plants found in a drop of water. An up to date and provoking film on the work of God the Creator. 28 minutes showing time.

Friday 13 December - Denis Peplar, an ex-employee of the Laboratory will be talking about his intended work as a Wycliffe Bible translator. Next year, with his wife and baby son, he hopes to go to Ghana and start his translation work. All are welcome to come along and meet him at 12.30 pm in the R12 Conference Room.

Advance Notice - This years Carol Service will be in the Lecture Theatre on Friday 20 December at 12.40 pm and will be led by the Rector of Didcot, the Rev B Whitehead.