

OMMON/CSCAL/IBM, NERR, NCH, NCAP, 23 N. NBR, NGR, NSCAN, YSEL, IYSEU, IYMAX, NTRAC 9 NS - N. 23 N. June R. 1975
BEGIN, NTK, NTRY, NMISS, NSSR, NFID, MAXMIM, NFIRST HARNOT, J.
DMMCN/CFID/MFX(20,3), MFY(20,3), NFDX(10,3), NF3
AB(2,20,3), NX(100,4), NY(100,4), XN(2), VN(8), I
IDY(100,2), JDX(4), JDY(4), IHS(4), ICV(2), IUN(2)
NCF(16), IFS, NFS, FX, FY, JK, PIC, KPIL, NCUUNT, NBIN
AXN, CTA, CTB, MX, MY, JA, JB, JC, JD, JE bulletin

#### THE FROZEN SPIN POLARISED TARGET

The Rutherford Laboratory Frozen Spin Polarised Target has been used to study the interactions -

$$\pi^{-}$$
 + p +  $\rightarrow$   $\pi^{0}$  + n  
 $\pi^{-}$  + p +  $\rightarrow$   $\eta^{0}$  + n

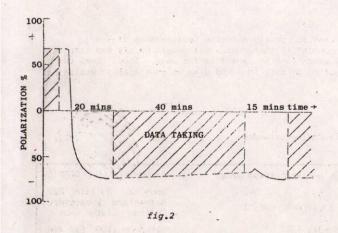
The data collection was completed by the end of January 1975. More than 200 million events were recorded at 22 momenta between 620 MeV/c and 2272 MeV/c, increasing the total world data sample for these reactions by an order of magnitude. Some ten per cent of the data has now been processed and preliminary results were presented at an HEP Seminar at the end of April.

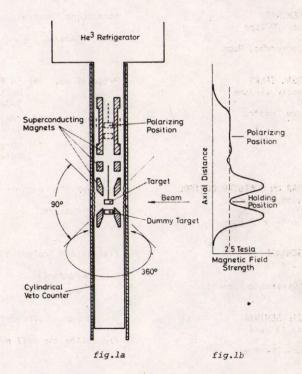
This is the first experiment using a frozen spin polarised target for which data taking has been completed, although there is another experiment using such a target at present taking data at CERN.

The operating principles of a frozen spin target can be understood by reference to figure (I.a). The protons in the target material, maintained at a temperature of 0.6-0.8K in a very uniform magnetic field of 2.5 Tesla, are polarised by irradiation with microwaves of 4 mm wavelength. When full polarisation has been achieved the microwave power is switched off and the proton spins "frozen" by reducing the temperature to 0.4K or below. At such a temperature, the polarisation decays very slowly.

ature to 0.4K or below. At such a temperature, the polarisation decays very slowly.

The target is then moved by a "holding" magnet of large angular access and, with the target in this position, data is collected. Although the magnet homogeneity is insufficient for polarising the target, it is adequate for maintaining the polarisation. The large angular access which the target provides is crucially important for high statistics studies of the reactions mentioned above.





The target has a volume of 5 cm  $\times$  2.5 cm  $\times$  1.5 cm; the material is propanediol ( $C_3H_8O_2$ ), with small quantities of Chromium V complexes added to it. This material is in the form of spheres 1.5 mm in diameter which are kept cold by immersion in liquid helium-3. The helium-3 is precooled and condensed by heat exchange with helium 4.

Figure (2) shows the variation of polarisation with time. Maximum polarisations in excess of 70% were obtained. The target was normally kept in the holding magnet for 40 minutes, and in that time the polarisation decayed by 5-6%. After data taking the target was returned to the polarising position, recharged with helium-3 and repolarised.

Both the polarising and holding magnets are superconducting. This is the first particle physics experiment at the Laboratory in which superconducting magnets have been used. These magnets were both operated at 2.5 Tesla and since their centres are 55 cm apart a third "booster" coil was introduced to avoid having a low field region through which the target had to pass.

The field distribution, figure (lb) shows how the field is maintained at about 2.5 Tesla or above. It also shows the existence of field gradients that could give rise to eddy current heating. To minimise this problem the cavity was fabricated from thin stainless steel sheet, copper and gold plated to give good microwave properties.

During the operating period, October 1974 to January 1975, the target was polarised more than 1500 times. In that period, the target system was operational for 85% of the available time - a very high reliability for such novel equipment.

# INTERNAL EVENTS

NIMROD LECTURE SERIES Monday 9 June 11.30 Lecture Theatre

STAFF MEETINGS Tuesday 10 June 10.30 and 15.00 Lecture Theatre

HEP SEMINAR Tuesday 10 June R61 Conference Room

PROPOSAL TALKS Wednesday II June 10.30 Lecture Theatre

SEMINAR ON COMPUTER CONTROL Wednesday II June 14.00 R12 Conference Room

HEP SEMINAR Thursday 12 June 11.00 R61 Conference Room

SPECIAL SEMINAR Friday 13 June 10.00 Lecture Theatre

NIMROD LECTURE SERIES Monday 16 June 11.30 Lecture Theatre

HEP SEMINAR Wednesday 18 June 11.00 R61 Conference Room

SEMINAR IN COMPUTING Friday 20 June 11.00 R61 Conference Room

NIMROD LECTURE SERIES Monday 23 June 11.30 Lecture Theatre

Deadline

for Insertions A Summary of the British-Scandinavian ISR Experiments. Dr B Alper/RL

The Director will preside. Please see RLC No. 11/75 for details.

Nondiagonal Neutral Currents. Dr G V Dass/RL

Proposal No. 169: "A Proposal to Measure D.R and R<sup>I</sup> IN pp Scattering, 200 to 525 MeV", Univ of British Columbia/QMC/Bedford College/Univ of Surrey. Talk to be given by Prof D V Bugg/QMC.

Proposal No. 168: "An Experiment on CP in a High Magnetic Field", Imp. Coll/RL. Talk to be given by Dr D M Binnie.

Proposal No. i70: "Branching Ratio for  $\pi^0 \rightarrow e^+e^-$ ", Omicron Collaboration. Talk to be given by Dr J D Davies/Dr N Tanner.

The CERN SPS Computer Control System

Dr J T Hyman/RL

Elastic and Inelastic Polarised Target Measurements at 8 GeV/c.

K Green/Oxford

The Daresbury Synchrotron Radiation Facility. Vic Suller and Neil Marks/Daresbury Laboratory

Backward Photoproduction of p and f Mesons in the Range 3-5 GeV/c.

Dr R Marshall/DL

Results from a Low Energy KiP Scattering Experiment.

Dr G Kalmus/RL

Mini Disks and Volume Protection.

A R Mayhook, A Stormer

The seminar will discuss ideas for possible future developments of space allocation on disk. The proposal is that real disks should be divided into "virtual" volumes in a way which is transparent to the user. These ideas can be developed to provide protection of both tape and disk volumes against accidental overwriting by outsiders.

Metal Bending and All That.

Professor J G Taylor/King's College, London.

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> GENERAL & SOCIAL NEWS INTERNAL & EXTERNAL EVENTS

Tuesday 1600 Wednesday 1200

H F NORRIS Room 42 Building R20 Rutherford Laboratory Chilton Didcot Oxon Abingdon 1900 Ext 484

Editor:

## **EXTERNAL EVENTS**

D UNIVERSITY

ELEMENTARY PARTICLE THEORY SEMINARS/NP DEPT - 14.30 hours

13 June: The Structure Functions F4 and F5 in Asymptotically Free Theories - Dr P Scharbach/

Dept of Theor. Phys.

20 June: Properties of Hadrons as Quark Bound States on the Null-plane - Dr C A Savoy/Geneva.

ELEMENTARY PARTICLE PHYSICS SEMINAR/NP DEPT - 14.30 hours

12 June: The Hanbury-Brown-Twiss Effect and Fireballs in High-energy Collisions - Dr G Cocconi/CERN.

NUCLEAR PHYSICS SEMINARS/LECTURE THEATRE, NUCLEAR PHYSICS LAB - 14.30 hours

9 June: Title to be announced - Dr W D Hamilton/Sussex.

16 June: Triple Correlations and the Identification of High-spin Continuum States in Ne & 24 Ng - Dr L K Fifield/Oxford N.P.L.

THEORETICAL PHYSICS SEMINARS/CLARENDON LAB - 16.15 hours

12 June: Temperature in Particle Physics - Mr W P Bauress.
13 June: Surface Electromagnetic Waves - Prof E Burstein/Univ. of Pennsylvania.

COLLOQUIA/CLARENDON LAB - 16.15 hours

13 June: Molecular Beams Experiments with Van der Waals Molecules - Prof D Kleppner/M.i.T.

LOW TEMPERATURE & SOLID STATE PHYSICS SEMINAR/CLARENDON LAB - 14.30 hours

12 June: Measurements in the Vacuum U.V. - Prof M Schlesinger/Ontario - Clarendon Lab.

CAMBRIDGE UNIVERSITY THE SCOTT LECTURES 1975/LARGE LECTURE THEATRE, CAVENDISH LAB - 16.45 hours

These lectures will be delivered by Prof. Steven Weinberg, Higgins Professor of Physics, Harvard University on 'Unified Theories of Elementary Particle Interactions'.

9 June: Particles, interactions & Symmetries; II June: Unified Gauge Theories; 13 June:

Applications and Speculations.

MANCHESTER UNIVERSITY THEORETICAL PHYSICS SEMINAR/NIELS BOHR COMMON ROOM - 14,30 hours

18 June: Phase Transitions in Spin Phonon Coupled Systems - Prof R J Elliott/Oxford.

SOUTHAMPTON UNIVERSITY

THEORETICAL & HIGH ENERGY PHYSICS SEMINARS/LECTURE THEATRE 'C' - 14.30 hours

13 June: Muon Deep Inelastic Scattering - Dr T Quirk/Oxford.
20 June: The Status of Quantum Gravity - Dr C Isham/King's College London.

SUSSEX UNIVERSITY

ATOMIC LASER & PLASMA PHYSICS SEMINAR/PB 1A6 - 14.15 hours

12 June: Micropulsations in the Geomagnetic Field - Dr D Southwood/Imp. College.

19 June: Polarized Neutrons - Dr G Williams/R.L.

THEORETICAL PHYSICS SEMINAR/PB 1A6 - 14.15 hours

12 June: The Laws of Thermodynamics - Dr R E Turner/Sussex.

NUCLEAR PHYSICS SEMINAR/PB 1A6 - 14.15 hours

16 June: Coulomb Energies in the A = 18 Nuclei - S Kahana/Brookhaven and Oxford.

DARESBURY LABORATORY

NUCLEAR THEORY SEMINARS/CONFERENCE ROOM NO. 3 - 14.00 hours 9 June: Scattering of Clusters by Nuclei - R Buck/Oxford.

23 June: Semi-classical Approach to Heavy Ion Scattering - N Rowley/Liverpool.

AERE, HARWELL

listed below -

THEORETICAL PHYSICS SEMINARS/CONFERENCE ROOM H8.9 - 14.00 hours.

10 June: Interaction between Voids - Prof J R Willis/Bath.

17 June: Title to be announced (Subject - Physics of Fast Reactor Accidents) - H Teague/ Culcheth.

### SOCIAL NEWS

1975 CIVIL SERVICE SAILING CHAMPIONSHIPS

Anyone interested in these championships which are

open to all dingy classes can obtain further details from Peter Craske, Ext. 232.

1975 SRC SPORTS DAY The annual sports day is on 3 July this year. Anyone wishing to take part should send in their names by 16 June at the very latest. The events and persons to contact are

Football - R Lawes Ext. 527 Cricket - J Rice Ext. 6363 or R Smith Ext 334

Bowls - T Molyneux Ext. 6210

Netball - Mrs P Coulthard, Ext. 6622
Tennis - P Craske, Ext. 232
Chess - P Craske, Ext. 232

CIVIL SERVICE LAWN TENNIS ASSOCIATION TOURNAMENT

Details of this tournament, to be held at Chiswick, 7-12 July 1975 can be

obtained from G Howard, R18, Ext. 6115. Closing date is 18 June.

CHRISTIAN FELLOWSHIP

Meeting at 12.30 on Friday

13 June, details not to hand. Friday 20 June - Sweet Water from an Old Well. During

the 17th Century, multitudes of ordinary British people were moved by the Gospel of Christ. What did the Puritan preachers say that affected people so as to change the course of history? Come and hear Dr Richard Sibbes, Master of Catherine Hall, Cambridge Preacher of Grays Inn, London as presented by J L Thomas at 12.30 in the RI2 Conference Room. Old nominal rolls can be very interesting and, enlightening. Until the latest issue was published, one name has consistently appeared in the section headed Nimrod, although after a few years the Miss did change to Mrs. The Miss was of course Janet who became Mrs Trotman. Janet has been around the Lab for 15 years being concerned with machine physics for the whole period.

She first joined the Nimrod Injector Group working initially for Terry Walsh. Janet recalls that she has only had two Division Heads, Leo Hobbis and David Gray and has only worked directly for three other people besides Terry Walsh - Roy Billinge, Graham Rees and John Maidment. She thinks they were all lovely people to work for.

On last Friday, many of her friends and colleagues gathered in Conference Room No. 2, RI, where David Gray after a short but amusing speech, presented Janet with a garden seat to which an engraved brass plate was attached bearing the words "Presented to Janet Trotman by her friends at the Rutherford Laboratory, 30 May 1975". David commented on the number of people Janet had helped with their computing, he was very sorry to lose her.

In addition to the seat David presented her with a large card containing 132 signatures. Janet has been 'computing' since the Harwell Mercury days and there are not too many people around who can make that claim. A letter from Janet contains the following message -



Obviously David finds this an EPIC occasion

"Please can I, through the Bulletin, thank all my friends at the Rutherford Lab for the magnificent garden seat that they gave me as a leaving present. Not surprisingly, I didn't get around to thanking all 132 of the signatories on the card personally on the last afternoon, but would like to take this opportunity to say thank you and goodbye to those I missed.

P.S. It didn't say 'Abingdon Borough Council' on the brass plate on the seat!"

We all wish Janet happiness in her new way of life however 'labourlous'-it may be for a time.

\* \* \*

MISSING EQUIPMENT Will anyone knowing the whereabouts of a Laboratory microscope and carrying case removed from Room 202, Bldg R25, please return this item or ring Ext. 6667.

Double Beam Serviscope Type D33R, Ser. No. 28249, Inventory Item N2/401. Anyone knowing the whereabouts of this item should contact Mr R Bairstow, Lab 6, RI, Ext. 379.

The following items have disappeared from the HPD room in Bldg RI:-

5/16" Electric Drill AERE No. 16178 Avometer Model 8, Ser. No. 51148-C-956

Anyone knowing the whereabouts of these items is asked to contact Mr R A Lawes, Ext. 527/246.

OVERSEAS VISITS Mr R Nickson, to CERN, 8-30 June, to work on equipment for Omega run on new  $\psi$  experiment.

Mr K C Myers, to CERN, 9-11 June, for discussions on

safety with Head of Safety Group. Mr D C Salter, to Grenoble, 9-13 June, for technical liaison with ILL staff.

Dr S F J Read, to CERN, 19-20 June, for discussions on polarised target work.

On polarised target work.

Dr D R S Boyd, to CERN, 16-19 June, to discuss pattern recognition techniques with Omega software team.

Drs A Astbury, C J Damerell, R T Ross and D H Saxon, to Palermo, 21-28 June, to attend European Physical Society Conference.

FILM BADGE NOTICE It is Period 6. Colour Strip GREEN for By films. Please check
that you are wearing the correct films and that all old
ones are returned.
Next film badge change - Monday 16 June.

RL NOTICES & CIRCULARS ISSUED DURING THE PREVIOUS FORTNIGHT RL Notice No. 8/75 -Overtime Credit for Non Industrial Shift

Workers.
RL Circular No. 11/75 - Staff Meetings.

NATIONAL SAVINGS CERTIFICATES

Monthly cycle ending 31.5.75. Certificates can now be collected from the Cash Office R2O. New members wishing to join the scheme can obtain elrolment forms from the Cash Office.

#### STOP PRESS

Special Lecture, Wednesday 18 June 15.15 in the Lecture Theatre.

Progress in Laser Fusion Research.

Dr P Hammerling/KMS Fusion, Inc. USA