



Rutherford  
Laboratory

26 February - 5 March 1973

bulletin

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## NIMROD SHUTDOWN, FEBRUARY TO APRIL 1973 - PART 3

Part 1 and Part 2 gave details of work in connection with the machine and beamlines. Part 3 outlines the larger items of work in connection with the power supply and ancillary plant which will take place.

**No 1 Solid Pole Rotor** The first solid pole rotor to be used on synchrotron pulsing duty was commissioned at RHEL in March 1969. Since then it has completed approximately 30 million pulses.

The field winding coil support bolts for this rotor work under an extremely arduous stress regime. In order to ensure the reliability of the power supply it was considered prudent to limit the life of these bolts to 30 million pulses, even though they are constructed to the best possible design and with the best possible material; accordingly the first set of these bolts is being replaced during the present shutdown. This involves a considerable amount of work including removing a drive motor and jacking up the alternator stator before the rotor can be "unthreaded".

**600 Hz Interphase Transformer** The interphase transformers employed in the Nimrod power supplies phase splitting system are also subjected to a pulsing mode. These have now completed 61 million pulses. One of these transformers is being detanked during the shutdown in order to examine the special coil fixings and to retighten where necessary. This inspection will determine whether or not the other one will also be inspected.

**Raw Water System** As was reported in last week's Bulletin, the largest part of the Laboratory cooling is derived from the cooling towers, which form part of a raw water system which cools the accelerator, the main power supplies, beamlines and even the computers. In spite of continuous chemical treatment the raw water remains very corrosive and attacks the pipes and fittings. One of the most important tasks in the early part of the shutdown is to overhaul and replace where necessary valves and fittings in these circuits. Not an easy task at this time of the year! This will be the first time for a decade that this work has been carried out. (All previous attempts have been thwarted by cooling water requirements).

**New Master Timer** The "heart" of Nimrod which controls the pulses and from which all other timing systems are derived is a Brown Boveri mastertimer. This timer has given and in fact still provides an excellent service. However, it is becoming increasingly obsolescent and difficult to maintain.

A new mastertimer has been designed by Roy Evans. This timer was built in the R3 workshop, employs TTL logic and will be more flexible than the existing one. If sufficient time for commissioning is available then it will be installed to give Nimrod, in today's idiom, a "heart transplant".

## FOUND

A sum of money has been found near Building R20. Enquiries should be made to Mrs S A Fones, Personnel Group, R20, Ext 495.

## UNDELIVERABLE MAIL

Camac Reports (2 copies of each) on 'Organisation of Multi-Crate Systems' and 'A Modular Instrumentation System for Data Handling', have been received from the Office for Official Publications of the European Communities, Luxembourg as part of an order. Will the person who placed this order please contact the Editor.

## ROAD SAFETY ON FERMI AVENUE - PICKING UP PASSENGERS

Cars are still stopping to drop or pick up passengers from the Rutherford or Atlas Laboratories in Fermi Avenue itself, thus causing other cars to overtake in the hatched area. This is a potentially hazardous abuse of the traffic scheme. Passengers should be dropped or picked-up either in the Rutherford red car park or in the Atlas car park and not in Fermi Avenue itself.

## FILM BADGE NOTICE

Period 3 commences Monday 26 February. Colour Strip - BROWN for 8y films. There will be no issue of neutron packs due to the Nimrod shutdown, so all previous issues must be returned.

Six monthly TLD issue for people with surnames commencing I J K L.



# INTERNAL EVENTS

HEP WEEKEND MEETING  
10.30 - 17.15 Sat., 24 February  
10.00 - 15.30 Sun., 25 February  
Lecture Theatre

CORRECTION:- Last week's announcement which stated that attendance was by invitation only, was incorrect; any member of staff who is interested is invited to attend.

*The meeting is on links between Weak and Electromagnetic Interactions.*

NIMROD LECTURE SERIES  
Monday 26 February  
11.30  
Lecture Theatre

Relativistic Quark Model Results  
*Professor N Byers/Oxford and UCLA*

APPLIED PHYSICS LECTURE  
Monday 26 February  
14.00  
Lecture Theatre

An Unorthodox Review of the Superconducting Applications Programme (1960 - 1990).  
*Dr P F Smith/RHEL (see News Section for more details about this new series)*

HEP DISCUSSION GROUP  
Wednesday 28 February  
11.00  
Conference Room, Building R1

Some Results on p and f Production in  $\pi^+ d \rightarrow pp \pi^+ \pi^-$  at 4 GeV/c  
*R L Sekulin/RHEL*

NIMROD LECTURE SERIES  
Monday 5 March  
11.30  
Lecture Theatre

Experimental Study of Deep Inelastic Neutrino Reactions  
*Dr K Schultze/Aachen*

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## TD - 1A NEWS

TD-1A survived the hibernation phase successfully and is now fully operational for a second sky scan. The spacecraft was de-spun and transferred to its three axis stabilised normal mode on the night of February 13-14. This operation is similar in some respects to that just after launch when TD was transferred from a tumbling mode to the normal mode, using automatic on-board systems. It is said that, during last weeks operation, some commands were forgotten but the spacecraft itself corrected the mistakes! The attitude control system (ACS) in TD must be one of the finest ever flown, its performance during the first sky scan being superb. There are 6 kg of gas left for the ACS (out of the initial 11 kg) which would allow a second hibernation and part of a third scan should this be of interest.

On February 14, the S2/68 detector system was switched on and 24 hours of dark counts were recorded before opening the focal plane shutter on February 15. Star signals were immediately seen and inspection of the data shows that the experiment is working well.

ESRO has approved an extended ground station network, which means that the two sky scans could result in over 80% of the data being recovered- a most satisfactory outcome compared with that feared at the time of the tape recorder failure.

Several interesting new observations have been reported recently, one of which is the eclipsing binary star system  $\delta$  PICTORIS which is known to consist of two stars rotating about their common centre of gravity. The eclipse of one component by the other has been observed in the UV on several orbits of TD. The results agree in general with observations from the ground showing that the two stars must have very similar temperatures, but the detailed UV observations reveal that  $\delta$  Pic is a more interesting object than was previously believed. The results from the short wavelength channel of S2/68 in particular lead to the conclusion that both stars may be surrounded by a common gaseous atmosphere. A second observation has been reported by our colleagues in Liege. This is a star cluster. It was believed that clusters would not be observed by S2/68 but it seems that, for this one at least, the UV flux is higher than expected.

Finally a puzzle which has existed throughout the first sky scan has now been resolved. Thus the appearance, always near the magnetic equator, of a region of emission which extends over about  $20^\circ$  of latitude. The feature appeared most prominently during the very first operational orbit of S2/68 in March 72 and has been seen sporadically on many subsequent orbits. It is also observed by the other UV telescope on board TD-1A (S59) though the viewing direction of the latter is  $8^\circ$  away, which rules out the feature as an emission from an astronomical object. Among other theories which were examined and rejected are; sunlight reflected off local debris or an ejected portion of the spacecraft; moon light entering the telescope tube; sunlight scattered from gas released from the ACS. The feature has now been identified as an atmospheric phenomenon, localised near the magnetic equator and extending over a few thousand km. The signal is attributed to sunlight scattered by singly ionised magnesium ions in a column above 550 km. The origin of the magnesium is meteoric dust at lower altitudes, the ions being transported vertically by a mechanism first proposed in 1972.



# EXTERNAL EVENTS

## NUCLEAR STRUCTURE AND NUCLEAR ASTROPHYSICS SEMINAR

Monday 26 February  
14.30  
Nuclear Physics Lab., Oxford

Photonuclear and neutron capture reactions in Astrophysics

*Dr B Patrick/AERE*

## THEORETICAL PHYSICS SEMINAR

Tuesday 27 February  
14.30  
Imperial College London

Backward Meson Nucleon Scattering and  $\bar{p}p$  Annihilation into Two Mesons

*Professor A Donnachie/Daresbury*

## THEORETICAL ASTROPHYSICS SEMINAR

Wednesday 28 February  
14.30  
Dept. of Astrophysics Oxford

The Relativistic Roche Problem

*Dr L J Fishbone/Maryland*

## THEORETICAL PHYSICS SEMINAR

Wednesday 28 February  
14.30  
University of Manchester

Diffraction and Power on Couplings

*Dr M B Green/Cambridge*

## APPLIED PHYSICS COLLOQUIUM

Wednesday 28 February  
16.30  
University of Reading

Manual Process Control

*Lisanne Bainbridge/Psychology Department*

## ELEMENTARY PARTICLE PHYSICS SEMINAR

Thursday 1 March  
14.15  
Nuclear Physics Lab., Oxford

Parity Doublets and the Mandelstam - Sommerfield - Watson Transformation as Applied to Backward  $K^+p$  Elastic Scattering and Polarization.

*Dr E J Sacharidis/RHEL*

## APPLIED MATHS SEMINAR

Thursday 1 March  
14.30  
Royal Holloway College

The Interpretation of Intensities of Solar Emission Lines

*Dr C Jordan SRC/Astrophysics Unit*

## ELEMENTARY PARTICLE THEORY SEMINAR

Friday 2 March  
14.15  
Nuclear Physics Lab., Oxford

$2\pi$  Exchange in Hadron - Hadron Scattering

*N Cottingham/Bristol*

## EVENTS AT AERE

### THEORETICAL PHYSICS SEMINAR

Tuesday 27 February  
14.00  
Conference Room, B8.9

The New Five Kilometer Radio Telescope

*Dr N J B A Branson/Mullard Radio Astronomy Observatory, Cambridge*

### PROCESS TECHNOLOGY COLLOQUIUM

Thursday 1 March  
10.30  
Conference Room, B220.24

Government-Industry Interaction in Research and Technology

*Dr D Budworth/Secretary Research Committee, CBI*

## RUTHERFORD LABORATORY BULLETIN

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Deadline  
for  
Insertions

GENERAL & SOCIAL NEWS

Tuesday 1600

INTERNAL & EXTERNAL EVENTS

Wednesday 1200

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## APPLIED PHYSICS LECTURES

A series of occasional lectures will be inaugurated on Monday 26 February in the Lecture Theatre at 1400 hours when Dr P F Smith will review the Rutherford Laboratory applied superconducting programme. (See 'Internal Events') In this series, lectures will be presented on technological developments of relevance to the continuing study of experiment particle physics. Obvious examples are the techniques for ultra high energy accelerators and development of particle detectors. Other more general subjects will be included. The lectures will be complementary to the Nimrod Lecture Series (usually held on Monday mornings) and it is hoped that they will be of interest to University visitors.

## OVERSEAS VISITS

Mr D A Gray, Mr G H Rees & Mr R T Elliott, to the USA, 24 February-10 March, to attend the 1973 Particle Accelerator Conference at San Francisco and to visit various laboratories. Mr G M McPherson and Mr C Maclean, to CERN, 26 February-2 March, for testing of the special purpose computing equipment on S 101 experiment. Mr G Gallagher Daggett to Vancouver and Edmonton, 3-16 March in connection with the BASQUE project.

## SOCIAL NEWS

### HORTICULTURAL SOCIETY NEWS

The Annual General Meeting was held on Monday last and for the benefit of members the names of the newly elected committee are given below

Chairman, also member for publicity and entertainment - W R Wiseman, Hangar 10 Ext. 2199  
Secretary - R Brabben, R20, Ext 410. Treasurer - R B Horn, R20, Ext 410

Committee members and where applicable their specific duties:-

Mrs V E Goodwin R1 Ext 6154

Miss W Morris R1 Ext 456

Mrs O Collett B521 Ext 5017

Mrs E Wernham B521 Ext 5106

Mrs K Carroll

P G Crane R32 Ext 337 (trading)

H F Norris R20 Ext 484

E V Symonds B424 Ext 2816/2644 (membership)

E L J Gardner B388.1 Ext 4000

S H Dixon B150 Ext 2886

R Gelder NRPB Ext 72-16-63

W E Norvell Grounds Dept Ext 2707

C Blocksidge Grounds Dept Ext 2707

The most important decision taken at the AGM was to hold only one show this year and although the date has not yet been fixed, it will be held in the second half of August. There will be classes for fruit, vegetable, floral arrangement, cooking and handicrafts, in fact practically everything covered in both the summer and autumn shows last year.

The evening lectures held in the Rutherford Laboratory's Lecture theatre were praised for the very high standard achieved and a plea was made for more support. The fees for top flight speakers reflect their standing and although the Society's finances are in a healthy state additional expenses have to be allowed for in this inflatory world. Membership now stands at 122 but we would welcome new members; we have quite a lot to offer for 15p a year. The Society is affiliated to the Royal Horticultural Society, the National Rose Society and the National Chrysanthemum Society and holds tickets for all their shows and entry to the gardens at Wisley. Year Books from these Societies are available on loan from Mrs Wernham who is the Librarian for our Society, as are books from the very comprehensive library held in B 521. Don't stop to think about it - join now, and take part in the very attractive programme now being planned for the coming year.

### RUTHERFORD & ATLAS RECREATIONAL SOCIETY SUPPER DANCE

This will be held on Friday 16 March, dancing to 'The Good Times' in the Rutherford Restaurant, from 8.30 till 1 am. Tickets, 65p on sale from:-

Mrs V Goodwin, R1; Mrs T Batchellier, R34; Mrs M Stoker, R1; Mr F Cooke, R9; Mr P Craske, R2. Hurry: tickets will not last long!

### CHRISTIAN FELLOWSHIP

Soon it will be Ash-Wednesday, the start of Lent in the Christian calendar - the time when some folk 'give up things' for this period. What significance has this on our lives? The Rev E Atkins of Harwell Parish Church will be talking about this in the R12 Conference Room at 12.30 on Friday 2 March. All are welcome to come along.

### RECORD SOCIETY

Tuesday, 27 February at 12.40 in the Lecture Theatre

Beethoven: Piano concerto No 2, Friedrich Gulda with the Vienna Philharmonic Orchestra conducted by Horst Stein

The so-called Second Piano Concerto was in fact his first composition in this medium and dated from 1794 when the composer was 24. It is due to the revision he made to the work in 1798 that it became known as No 2 whereas No 1 had been completed the previous year. Although only occasionally heard it is a remarkably mature work.