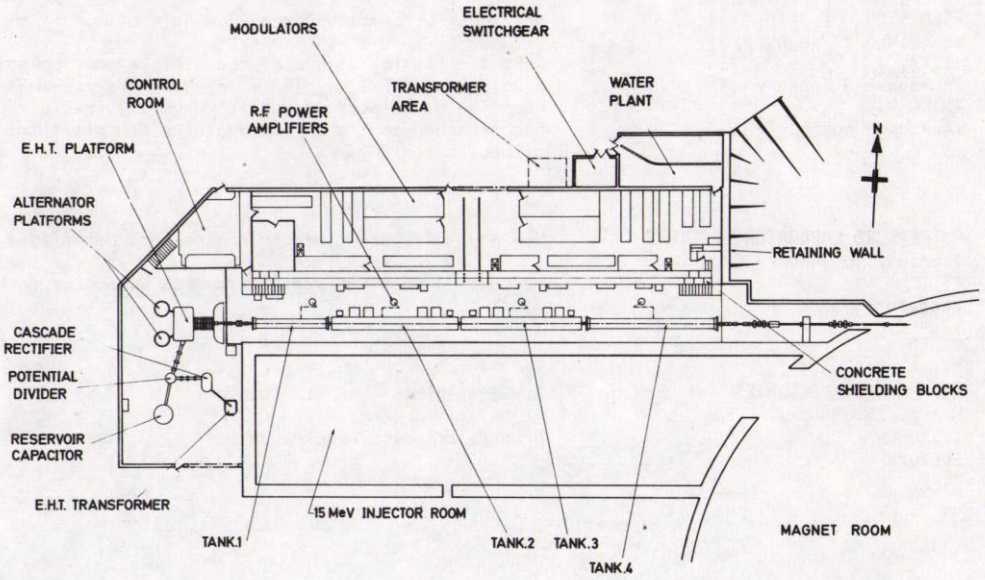
Rutherford Laboratory

15-22 January 1973

bulletin 2

## NIMRODS NEW INJECTOR WILL MEAN AN EXTRA 8000,000,000,000, PROTONS PER PULSE




*Proposed layout for the new 70 MeV injector for Nimrod.*

Just before the Christmas holiday, a message chalked on a blackboard in the RI foyer announced the 'glad tidings' that the new 70 MeV injector for Nimrod had been approved, the largest project at the Laboratory since Hall 3.

Full financial approval is now through and as design work had been proceeding at the Laboratory for some time prior to this approval, the placing of contracts for the required building and main items of equipment can now be expected to go ahead rapidly. If all goes according to plan the new injector should be ready for commissioning in the Spring of 1975, about 2½ years time.

Why a new injector? The present extracted beam intensities of Nimrod are $1.2 \times 10^{12}$ ppp (Protons per pulse). The various improvements mentioned in the "Work of the Rutherford Laboratory for 1971" report, in particular the 2nd harmonic RF system which is due for installation in the next annual shut down period, should raise this figure to $2 \times 10^{12}$ ppp. However the range of physics using Nimrod as the secondary particle source could be much extended if the intensity was increased to $10^{13}$ ppp which is a factor of 5 up on the $2 \times 10^{12}$ figure. Due to transverse incoherent space charge effects it becomes necessary to raise the injector energy from 15 MeV to 70 MeV to achieve this increase.

The new injector will be an Alvarez type of linear accelerator consisting of four R F cavities. The design of the first and fourth cavities is based on corresponding parts of the injector in use on the NALs 200 GeV accelerator in the U.S.A. The old PLA (theres a name to conjure with) provides tanks 2 and 3 which with only minor modifications will be used as the second and third cavities of the new injector. Where possible, quadrupoles from the P.L.A. will be used and the de-buncher ramper cavity will be an ex PLA unit.

It is intended that for some time Nimrod will operate with both the 70 MeV or 15 MeV injectors available. As will be seen from the diagram above the new injector will be located in a building which will abut on to the existing 15 MeV injector building.

## RUTHERFORD LABORATORY LECTURE

Dr Charles Ford, FRS, of the Sir William Dunn School of Pathology in Oxford will give the next lecture in the Rutherford Laboratory Lecture series at 15.15 on Thursday 18 January in the Lecture Theatre. The title of his talk will be "New Way of Looking at Chromosones and Genes".

New techniques have been introduced in the past few years that promise to increase considerably the understanding of the organisation of genetic material. The new methods involve sophisticated biochemical procedures, electron microscopy and autoradiography but there still remains an important place for the conventional microscope and for the manipulation of cells, in culture. The principles underlying the new methods will be described

*continued on page 4*

# INTERNAL EVENTS

**NIMROD LECTURE SERIES**

There will be no lecture in the series this week.

**HEP DISCUSSION GROUP**
Wednesday 17 January
11.00
Conference Room, Building R1

Multiplicity Distributions at Very High Energies and the Airy Proton

***P Olesen/Niels Bohr Institute, Copenhagen***

**FILM SHOW**
Wednesday 17 January
13.15
Thursday 18 January
12.40
Lecture Theatre

Heartbeat of a Volcano - a 21 minute colour film

Dramatic filming at one of the earth's most powerful land building processes - a volcanic eruption. The film shows the two-week building and awesome nine-hour eruption of Kilauea in Hawii. Unusual views of "degassing" and cessation of the eruption add to the unique features of this film. An outstanding film with a climactic finish.

**RUTHERFORD LABORATORY LECTURE**
Thursday 18 January
15.15
Lecture Theatre

New Ways of Looking at Chromosomes and Genes (see news section for details)

***Dr Charles Ford FRS/Sir William Dun School of Pathology, Oxford.***

**NIMROD LECTURE SERIES**
Monday 22 January
11.30
Lecture Theatre

1. Eta Primes 2. Tachyons

***Dr G Kalbfleisch/Brookhaven***

# NIMROD SCHEDULE

CYCLE 17 2 1 73 - 23 1 73 MACHINE PHYSICS HIGH ENERGY PHYSICS

| Team | Beam | Experiment | State |
|---|---|---|---|
| BRISTOL UNIVERSITY/ SOUTHAMPTON UNIVERSITY/ RHEL | K15 | $\pi^{\pm}p$ Differential Cross-Sections | Data |
| GLASGOW UNIVERSITY/ RHEL | $\pi$9 | $\pi^{-}p$ Differential Cross-Sections | Data |
| IMPERIAL COLLEGE/ SOUTHAMPTON UNIVERSITY | $\pi$7 | Studies of $\eta$ $\omega$ and $A2$ | Data |
| CHURCHILL HOSPITAL/ BART'S MEDICAL COLLEGE/ RHEL | $\pi$11 | Radiobiological Experiments | Data |

* * * * * * * * * * * * * *

**OVERSEAS VISITS**
contd from page 4

Mr L Phillips and Mr E Towndrow, to CERN, 14 - 26 January, for installation of equipment for muon experiment.

Dr J B Forsyth, to ILL Grenoble, 17 - 25 January, for technical discussions on neutron beam apparatus.

Dr D B Scott to the University of Njimegen, 18 - 19 January, to attend a meeting of the SEAS Graphics Working Committee

Dr Margaret Curtis, to Amsterdam, 20 January for one day, to attend SEAS Executive Board Meeting

# EXTERNAL EVENTS

**THEORETICAL PHYSICS SEMINAR**
Monday 15 January
16.15
Queen Mary College, London

Feynman Graph Methods in Critical Phenomena

***Dr D J Wallace/Southampton***

**PHYSICS COLLOQUIUM**
Monday 15 January
17.00
University of Reading

Electro-Optical Effects in Liquid Crystals and Their Use in Displays

***Dr J Kirton/RRE Malvern***

**NUCLEAR PHYSICS SEMINAR**
Wednesday 17 January
14.30
King's College London

Some Aspects of High Energy Physics at CERN

***Dr W R Gibson/Queen Mary College College and CERN***

**THEORETICAL PHYSICS SEMINAR**
Wednesday 17 January
14.30
University of Manchester

The Bound State of the Triton : A Review

***Professor L M Delves/Liverpool***

**IERE BRANCH MEETING**
Thursday 18 January
19.30
University of Reading

Visual Telecommunications Systems : A Review of Some Technical Problems

***I F Macdiarmid/P O Research Station, Dollis Hill***

# SOCIAL NEWS

**CHRISTIAN FELLOWSHIP**

Friday 19 January. The fourth talk on "The Five Steps to Heaven" will be led by Derek Smaje. If you are not sure on how to get to Heaven or even where it is, why not come along. The meeting commences at 12.30 in the R12 Conference Room.

**MODEL RAILWAY CLUB**

'Layout Discussion', an important subject for the model railway enthusiast, so don't forget to attend the next meeting which is at 12.30 (note change of time) on Monday, 15 January in the Music Room of the Recreational Society's hut.

**RECORD SOCIETY**

Tuesday, 16 January at 12.40 in the Lecture Theatre.

'Orchestral Fireworks' - by the Hollywood Symphony Orchestra

This is a selection of classical works noted for their glitter and sparkle - the sort of music which makes concert audiences sit on the edge of their seats.

**LATE CHESS NEWS**

Jim Riddle beat Alan Gilby, Peter Craske and Bill Turner still playing - more news of this vital sixth round next week.


RUTHERFORD LABORATORY BULLETIN *Published by the Scientific Administration Group* *Editor:* H F NORRIS

Room 42 Building R20
Rutherford Laboratory
Chilton Didcot Berks
Abingdon 1900 Ext 484

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

**RUTHERFORD LABORATORY LECTURE contd**

and the organisation of the chromosomes discussed in the light of the new information obtained.

**THEORETICAL PHYSICS CONFERENCE**

During January 3 - 5, RHEL was the scene for the Informal Theoretical Physics Meeting. This is a regular annual event, attended by up to 200 people - faculty and students - from the British Universities. The subject of course was particle physics.

One of the main themes was multiparticle production, which is the dominant feature of very high energy interactions. C. Rubbia (CERN) surveyed the latest experimental results from NAL and ISR; E Berger (ANL/CERN), H Harari (Weizmann Institute) and D P Roy (RHEL) described theoretical approaches from different angles: fragmentation models, the two-component philosophy, and duality ideas in the Mueller framework.

Weak and electromagnetic interactions formed another focus. J C Taylor (Oxford) reviewed the recent revival of gauge theories, that unite weak and electromagnetic interactions. D H Perkins (Oxford) and C Llewellyn-Smith (CERN) described what has been and can be measured through inelastic electron, muon and neutrino scattering. The current excitement is in results concerning partons, pointlike substructures that have been discovered within the proton.

The program was balanced with talks by P Goddard (Durham) on formal aspects of duality, and by J L Petersen (Nordita) on the $\pi$-$\pi$ interaction. To widen our horizons, D Lynden-Bell (Cambridge) gave a mathematician's introduction to the theory of black holes in general relativity.

**FILM PROCESSING - A LIGHT HEARTED REPORT ON ANOTHER RECORD!**

It is not Bulletin policy to publish letters to the Editor, however the following extract from a letter, no doubt inspired by last weeks news item on Nimrod's record year, may bring some cheer to the January gloom.

"It is worth recording that we (the Photographic Section) processed over 400 miles of experimental film (on which the success of these experiments largely depend) in 1972. The many technical problems associated with such a vast amount of film are perhaps not generally known. Not the least of these was the design and construction of a narrow and very long developing tank. As everyone knows, film must be developed in the dark. To achieve this the staff had to close their eyes at the precise moment the film was immersed in the developing solution. This created problems of synchronisation with staff deployed at Southampton, Oxford, Leicester, York and 50 miles off the coast of Fife".

**REPROGRAPHIC SECTION REQUEST**

The Reprographic area in R1 is to be redecorated during the week beginning 15 January. The Section will therefore be working under difficulties. It will be appreciated if demands on their services are kept to a minimum during this work.

**FILM BADGE NOTICE**

It is Period 1, 1973. Colour Strip - PURPLE for $\beta\gamma$ films and neutron packs. Please check that you are wearing the correct dosimeter and that all old ones are returned.

**AERE TRANSPORT - OXFORD POLYTECHNIC**

We have just learned that the departure time of AERE transport leaving Oxford Polytechnic was changed from 21.00 hours to 20.30 on 8 January 1973.

**UNDELIVERABLE MAIL**

A letter and catalogue of reactor grade graphite has been received from Ringsdorff-Werke GMBH addressed to someone at the Laboratory whose reference is shown as NH - 6 12 72. Letter and catalogue can be collected from the Editor.

**MISSING EQUIPMENT**

The following item of equipment has been reported missing from R12 Workshop A1/A2 -

"½" Electric Drill, Wolf Sappfire, marked AERE 21754

Anyone with information on the present whereabouts of this item is asked to contact J A Macken, Building R12, Ext 311.

The following item of equipment has been reported missing -

Tektronix Adaptor Type 81 Serial No 7111

Anyone with information on the present whereabouts of this item is asked to contact Dr T G Walker, Building R1, Ext 6256/301

**OVERSEAS VISITS**

Dr W Venus, to CERN 14 - 15 January to attend $K^{o}_{L}$ Experiment Collaboration Meeting.

***overseas visits continued on page 2***