

17 February - 3 March 1975

COMMON/CFID/MFX(20,3), MFY(20)
FAB(2,20,3), NX(100,4), NY(100,10)
FDY(100,2), JDX(4), JDY(41, IH)
NCF(16), IFS, NFS, FX, FY, JK, PTO
MAXN, CTA, CTB, MX, MY, JA, JB, JC

bulletin

4

FOR USE WITH PT55 POLARISED TARGET

A week of testing of the superconducting magnet for the PT55 Polarised Target was successfully

completed on 17 January 1975.

The magnet is specified to give a central field of 2.5 T with a homogeneity of ± 2 parts in 10⁴ over a region 30 mm diameter and 50 mm long occupied by the target itself and to maintain a magnetic field stability of 2 parts in 10⁵ over a period of eight hours.

The magnet consists of two pairs of superconducting solenoid coils positioned about a horizontal axis such that there is clear access from the target position over an exit cone of 60° semi-angle to allow secondary particle detection. This special access requirement, much larger than normally used in polarised target experiments, raises difficulties for the magnet designer. To obtain the required field homogeneity it is necessary to employ a pair of main coils with a pair of smaller diameter coils inside them powered to oppose the main field. This in turn means that although the central field produced by the system of coils is only 2.5 T, the peak field seen by the superconductor is 5.6 T. (It is the peak field rather than the central field which characterises the difficulty of the design of superconducting magnets.)

The interactive graphics computer program GFUN was used to optimise the coil sizes and configuration for acceptable values of field homogeneity, peak field and peak stress.

The coils are constructed from Nb.Ti. superconducting wire of I mm diameter comprising 361 twisted filaments of 0.03 mm diameter. Over 13 km are used in the winding which was carried out in the Laboratory. The completed coils are individually potted and are easily the largest diameter coils to be handled in the Resin Laboratory to date.

The general assembly of the coils and cryostat can be seen in Figure 1.

A special power supply was developed by the laboratory to power the assembly and give adjustable current setting for each coil.

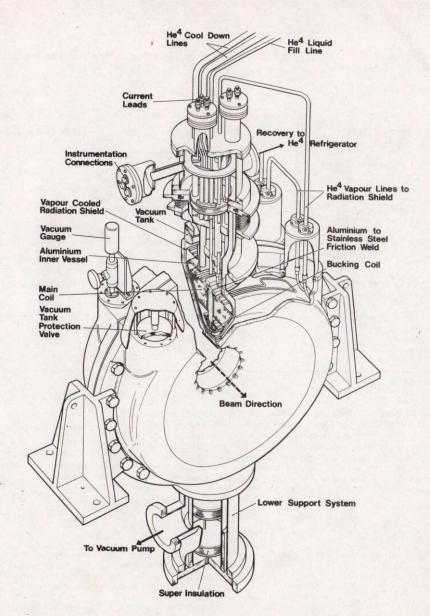


Fig 1 - general assembly of the coils and cryostat

Figure 2 shows the general layout of the test facility. The coils are suspended horizontally from the top plate, ready for lowering into the large tub cryostat in the background. During the test, magnetic field homogeneity measurements were made at 1.5 Tesla and 2.5 Tesla central field and with minor adjustments in the bucking coil

currents, the specification of \pm 2 parts in 10⁴ over the the target volume was easily achieved.

In running the coils up to the full central field a quench occurred at 2.48 Tesla and most of the 0.5 MJ of stored energy was dumped into the coils, raising their temperature to 130K. On the second run the magnet reached 2.62 Tesla without quenching.

INTERNAL EVENTS

NIMROD LECTURE SERIES Monday 17 February 11.30 Lecture Theatre π^+ d Interactions at 4 GeV/c, and the Production of Vector and Tensor Mesons Dr R Sekulin/RL

TRADE DEMONSTRATION Monday 17 February 09.30-15.30 Building R20 lay-by A mobile exhibition from J J Lloyd Instruments Ltd will be visiting the Laboratory to demonstrate precision electrical calibration and test equipment plus graphic recording instruments.

HEP SEMINAR Wednesday 19 February 11.00 Lecture Theatre

Spin of Leading Clusters and Slope of the Overlay Function

N Sakai/RL

NIMROD LECTURE SERIES Monday 24 February II.30 Lecture Theatre Diffraction Scattering at Infinite Energies

Dr J S Ball/CERN

HEP SEMINAR
Wednesday 26 February
II.00 .
Conference Room R61

Isobar Model Analysis of K n giving K $\pi^- p$, $K^0 \pi^0 n$ in the Centre of Mass Energy Region 1.90–2.17 GeV

M Corden/Birmingham

SEMINAR IN COMPUTING Friday 28 February 11.00 Conference Room RI2 (not R61 as previously advertised)

Computer Assisted Learning Projects in Medicine and Mathematics $\underline{\text{or}}$ How to Kill Programs and Not People

D B Scott/Glasgow University Computing Service

NATIONAL SAFE DRIVING AWARDS This is the time of the year when the National Safe Driving Awards are announced. The National Scheme,

started in 1927 by the Royal Society for the Prevention of Accidents, attracts huge entries each year and the Awards are high valued. It is therefore a pleasure each year to record the Laboratory's drivers achievements. The awards for 1974 go to:-

Mr H Patterson - Bar to 15 year Medal (18 accident free years)

Mr E A Smith - Bar to 10 year Medal (12 years)

Mr A Hill - Bar to 10 year Medal (11 years)

Mr J Culley - 10 year Medal

Mr R E Smith - Bar to 5 year Medal (8 years)

Mr D Stock - Bar to 5 year Medal (8 years)

Mr B T Field - First Year Diploma

OBITUARY NOTICE

We deeply regret to announce the death on 6 February 1975 of Sam Harris, Atlas Laboratory. Sam was one of the first people to be engaged as an operator in the early Harwell days of the Mercury computer and, in fact, joined Dr Howlett and James Hailstone on 29 December 1958.

He had been in fairly poor health for a number of years but in spite of this had given the Atlas Laboratory excellent service in looking after their large communications switchboard. A lot of users have commented on the unfailing help and friendliness which they had from Sam. We extend our deepest sympathy to his wife.

RUTHERFORD LABORATORY BULLETIN

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Editor: H F NORRIS
Room 42 Building R20

Deadline for Insertions GENERAL & SOCIAL NEWS

INTERNAL & EXTERNAL EVENTS

Rutherford Laboratory Chilton Didcot Oxon Abingdon 1900 Ext 484

Tuesday 1600

Wednesday 1200

EXTERNAL EVENTS

OXFORD BRANCH

HE CONSERVATION SOCIETY BLACKFRIARS! MEETING ROOM, ST GILES - 20.00 hours

19 Feb: Nuclear Power, What are the Dangers? - Dr B A J Lister/Head of Nuclear Environment Branch, AERE, Harwell. The talk will be introduced by Dr J D Lawson/Conservation Society and will be followed by a discussion. All are welcome.

OXFORD UNIVERSITY

THEORETICAL ELEMENTARY PARTICLE PHYSICS SEMINAR/N.P. DEPT - 14.20 hours 21 Feb: Principles of Supersymmetry - Professor L O'Raifeartaigh/IAS, Dublin.

THEORETICAL PHYSICS SEMINARS/CLARENDON LABORATORY - 16.15 hours

20 Feb: New Particles, Old Ideas and Fresh Hopes - Dr D Broadhurst/Oxford. 27 Feb: The Relativistic Quark Model - Professor R Moorhouse/Glasgow.

COLLOQUIA/CLARENDON LABORATORY - 16.15 hours

21 Feb: Some Applications of Superconductivity, in Particular the Japanese High Speed Rail Project - Professor K Oshima/Director General for Scientific Affairs, OECD, Paris.

28 Feb: The Energy Balance of the Solar Corona and Transition Region - Dr R W P McWhirter/ Appleton Lab, Culham.

LOW TEMPERATURE AND SOLID STATE PHYSICS SEMINAR/CLARENDON LABORATORY - 14.30 hours 20 Feb: Heat Pulses in Paramagnetic Crystals - Dr K Wigmore/Lancaster University.

ROYAL HOLLOWAY COLLEGE

APPLIED MATHEMATICS SEMINAR/MATHS DEPT, MAIN BUILDING - 15.00 hours 20 Feb: On Hypersonic Self-Induced Separation - Dr S M Brown /UCL.

MANCHESTER UNIVERSITY

THEORETICAL PHYSICS SEMINAR/NIELS BOHR COMMON ROOM - 15.45 hours 26 Feb: Meson Spectroscopy - Dr A D Martin/Durham.

SURREY UNIVERSITY

NUCLEAR PHYSICS SEMINARS/ROOM 08 AC 22 - 14.15 hours 19 Feb: Single-Nucleon Transfer in Heavy-lon Reactions - M A Nagarajan/Daresbury. 26 Feb: Title to be announced - F S Levin/Surrey - Brown University.

SUSSEX UNIVERSITY

NUCLEAR PHYSICS SEMINAR/PHYSICS BUILDING, ROOM PB \neg A6 - 14.15 hours 17 Feb: The $\beta\text{-Decay}$ of ^{14}B - Dr J Millener/Oxford.

LOW TEMPERATURE AND SOLID STATE SEMINAR/ROOM 4A25 - 14.15 hours

18 Feb: The Place of Superconducting Machines in Industry - Dr A D Appleton/Int. Res & Dev Co Ltd.

OUEEN MARY COLLEGE

THEORETICAL PHYSICS SEMINARS/PHYSICS LECTURE THEATRE - 16.15 hours 17 Feb: Is There a Superfluid Velocity in He^3 ? - Professor H E Hall/Manchester.

24 Feb: Theory of Ferromagnetism in Transition Metals - Professor J Callaway/Louisiana & Imp Coll.

DARESBURY LABORATORY

DARESBURY LECTURE SERIES/LECTURE THEATRE - 14.00 hours

18 Feb: Some Problems of Collective Motion in Nuclei - J C Willmott/Manchester

25 Feb: Title to be announced - J S Ball/Utah - CERN.

THEORETICAL PHYSICS SEMINAR/OLD CONFERENCE ROOM - 14.00 hours

24 Feb: Off Mass Shell States and Currents in the Dual Model - D B Fairlie/Durham

EVENTS AT AERE HARWELL

NUCLEAR PHYSICS DIVISION COLLOQUIA/CONFERENCE ROOM, HANGAR 8 - 15.30 hours

20 Feb: The Role of Oxides in the High-Temperature Wear of Alloys - Professor G C Wood/UMIST.

27 Feb: Title to be announced - Dr V Schonfelder/Max Planck Institute for Extra-Terrestial

Physics.

THEORETICAL PHYSICS DIVISION SEMINARS/CONFERENCE ROOM, BUILDING 8.9 - 14.00 hours

18 Feb: Infra-Red Absorption from Impurity Complexes in Semiconductors - Dr R Newman/Reading. 25 Feb: Accidents in Fast Reactors - Mr F R Farmer/Director, SRD, Culcheth.

This is equivalent to 105% of the operating current (103 amperes).

The above tests were carried out in a helium bath temperature of 4.2K. To simulate the actual operating conditions, where a closed circuit refrigeration system will be used to minimise running costs, the liquid helium temperature was raised to 4.45K by pressurising the cryostat (approx. 1.3 bars absolute). The coils were run up again to 2.62 Tesla and held at this field for 30 minutes.

The coils will now be assembled into the specially designed magnet cryostat, coupled to the CTI 1400 refrigerator and given a final test with the target assembly, prior to moving the whole equipment to Hall 3.

This project was carried out by staff from the Department of Engineering Science and Applied Physics Division. Very valuable support was given by other departments in the Laboratory, in particular the R9 Workshop and the Outside Manufacturing Group.

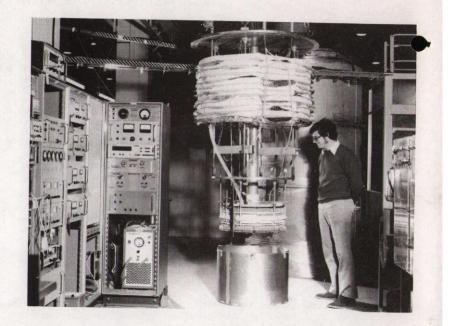


fig 2 - general layout of the test facility

SLIDE LIBRARY

The central slide library is now located in the Microfiche area of the main library. About 1000 slides are filed in negative number sequence. A file of reference prints arranged under subject headings permit rapid location of the slides. The slides can be borrowed provided details are given in the slide loan book. For further information please contact Mr F Harden, Ext 6114.

FILM BADGE NOTICE It is Period 2. Colour Strip - PURPLE for $\beta\gamma$ films. NOTE that it is no longer necessary for neutron packs to be worn due to the Nimrod shutdown. Please ensure that all these packs have been returned.

Next Film Change - Monday 24 February 1975.

WHERE ARE THEY? Will owners or anyone else knowing the whereabouts of the following IBM I/O writers, serial numbers - 804116, 99733, 99827, 802425, please contact M J Hotchkiss, Building RI, Ext 6238.

OVERSEAS VISITS Mr H O Normington and Mr C Page to CERN, 17 February, to continue dismantling of Muon experiment on ISR.

Dr G E Kalmus, to CERN, 18-22 February, to attend CERN Track Chamber meetings and for discussions on BEAM and BEBC schedule.

 $\ensuremath{\mathsf{Mr}}$ D Jones, to Brussels, 24-27 February, to attend CAMAC meeting.

Dr N Sakai, to France, I–9 March, to attend Méribel Conference.

The Director, to the USA, 2-8 March, to attend Seminar on Perspectives in High Energy Physics, New Orleans

SOCIAL NEWS

MESSAGE OF THANKS A letter has been received from Nellie Neal asking for the following message to be put in the Bulletin -

"I should like to say thank you very much to the many people who contributed towards the lovely gifts presented to me on my leaving the Laboratory. I am sorry I could not thank everyone personally. My $9\frac{1}{2}$ years at the Laboratory have been very happy ones."

CHRISTIAN FELLOWSHIP Pastor Brian John of Wantage
Baptist Church will be leading
the second meeting on the theme of LOVE. What is true
love and how can we experience this in our lives in both
giving and receiving? What is Christian love and how
does it differ from other sorts? All are welcome to
come along at 12.30 on Friday 21 February to the RI2
Conference Room.

On Friday 28 February, John Thewlis of the Atlas Laboratory will be chairing a meeting in which members of the Fellowship will share their views and experiences of Christian LOVE and JOY. All are welcome to come along. The meeting is at 12.30 in the R12 Conference Room.

HORTICULTURAL SOCIETY EVENING LECTURE

After a long interval the Society is presenting an evening lecture on Tuesday

25 February at 7.45 pm. The speaker is Mr K Burras, NDH, the Superintendent of the Oxford Botanic Gardens and the title of his lecture is "Plant Hunting in South Africa." His previous lectures have always attracted a large audience and the Society hopes that as many members and friends as possible give their support to this evening. Ken Burras not only gives extremely interesting talks but his colour slides are a pleasure to watch. Tickets at 25p are available from Val Goodwin, RI, Roy Brabben R20 or the Editor.