



COMMON/CSCAL/IBM , NERR, NCH, NGAP, ISCAN, NBK, NGR, NSCAN1, NRO
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COMMON/CFID/MFX(20,3), MFY(20,3), NFDX(10,3), NFX(3)
TAB(2,20,3), NX(100,4), NY(100,4), XN(2), YN(8), IB(10
R IDY(100,2), JDX(4), JDY(4), IHS(4), ICV(2
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New Plans For Nimrod Complex Could Provide University Scientists With World Beating Facilities

Rutherford Laboratory has released plans, based on the existing Nimrod complex, for a new high - intensity neutron source many times more powerful than anything in the world today. The intensity would be so high that a diffraction pattern which now takes half a day to obtain using the most sophisticated sources available could, with the right instrumentation, be measured in about 1 second.

On Friday, 7 May about 70 scientists with an interest in the use of neutron beams visited the Laboratory to discuss plans for a new powerful neutron source, which if finally approved, could turn RL into a national centre for neutron beam research, with facilities unrivalled in Europe if not the world.

The beams are used by physicists, chemists, materials scientists and biologists to study the structure and properties of a wide range of "condensed matter" - solids and liquids - including crystalline materials, alloys, defect solids, liquid crystals, ferroelectrics, amorphous polymers, living tissues, proteins and viruses.

The beam energies and other parameters have to be matched to the binding energies and dimensions of the specimens being studied. These binding energies correspond typically to thermal (up to say 100 milli-electron volts) or epithermal (hundreds of milli-electron volts) neutron energies. This means that the maximum energy of the neutron beam is of little significance - a marked contrast to the High Energy Physicists' constant obsession with higher and higher beam energies. The important parameter is the beam intensity.

As is the case with High Energy Physics, few universities have experimental facilities of their own, and neutron beams are provided mainly by fission reactors at a number of research centres, notably at Harwell and at the Institut Laue-Langevin (ILL), Grenoble. Use is also made of the Harwell 30 MeV electron linear accelerator as a modest but scientifically significant "pulsed" neutron source.

Steady state high flux reactors are now close to the limits of technology mainly due to the difficulty of extracting large amounts of heat from the comparatively small volume of the core, and pulsed neutron sources based on accelerators seem to be the most economic way of generating intense neutron beams. At present the Neutron Beam Research Committee is looking at the scientific potential of a high-intensity pulsed neutron source based on the existing Nimrod complex which would produce its neutrons by proton "spallation" of heavy targets.

In spallation, neutrons are made by bombarding a heavy element like lead or uranium with protons of about 1 GeV energy. As well as being a prolific source of neutrons, this spallation process produces minimal heat - only 50 MeV per neutron compared with 200 MeV per neutron in a fission reaction.

Other countries too have realised the potential of accelerator-based neutron sources. Argonne has a proposal for a similar spallation source, and the Japanese also have plans. But the facilities and resources which are already available in the Nimrod complex mean that a powerful new neutron source could be built at RL quickly and for minimal cost, and would put the UK in the forefront of research in this field.

As well as being used in condensed matter research, the new machine could supply pions for medical, radio-biological and nuclear structure work, while muon beams could also be produced for experiments in solid-state physics and chemistry.

SPS PROTONS CIRCULATE

The first SPS proton beam at CERN successfully circumnavigated the 6.9km ring on the morning of Monday 3 May. The same afternoon the beam circulated 12000 times (a distance of 72800km) without any corrections to its position. However, acceleration of the beam is proving to be tricky, but it is still hoped to achieve full energy by 24 May - a significant date for a certain VIP at CERN.

In the meantime, our American friends at NAL are not sitting on their hands. Last Friday, 14 May, they achieved 500 GeV for 7 hours during which time they had extracted the beam into the neutrino area and obtained bubble chamber pictures.

BULLETIN NOTICE

Deadline for copy for next Bulletin - 1200 hrs on Monday, 24 May. Please send information to Editor as early as possible.

FILM BADGE NOTICE

Period 6 commences Monday 17 May. Colour Strip - PURPLE for B_γ films and neutron packs. Please change your films promptly and return ALL old ones. Six monthly TLD change for people with surnames commencing U, V, W and X.

MISSING EQUIPMENT

The following item of equipment has been reported missing from Lab 4, East Wing R34 - Tektronix Type M, Plug-in Unit. Ser. No. 100183. Anyone with information on the present whereabouts of this unit is asked to contact Mr J V Smith, R34, Ext. 6233.

INTERNAL EVENTS

NIMROD LECTURE SERIES

Monday 17 May
11.30
Lecture Theatre

A New Baryon Spectroscopy?

Professor R H Dalitz/Oxford

SPECIAL HEP SEMINAR

Tuesday 18 May
1400
R61 Conference Room

Inclusive Production of Resonances

M J Counihan/CERN

HEP SEMINAR

Wednesday 19 May
11.00
LECTURE THEATRE

Inclusive Processes at Large Transverse Momentum

B Combridge/DAMTP

HEP DATA HANDLING SEMINAR

Wednesday 19 May
13.30
R61 Conference Room

Two Related Topics:

Multi-Wire Proportional Chambers in Medical Applications - *D H Reading/RL*
The Reconstruction of Pictures from Their Projections - *P Wilde/RL*

CHRISTIAN AID FILM

Thursday 20 May
12.40
Lecture Theatre.

'Migrant Way', a 35 minute colour film.

In Christian Aid Week we are showing the film 'Migrant Way' which highlights the problem of a migrant agricultural worker in North-East Brazil. A government funded irrigation project and the Christian Aid sponsored Gurupi settlement, point the way to a better future.

RUTHERFORD LABORATORY LECTURE

Thursday 20 May
15.15
Lecture Theatre

Aspects of Energy Research in the Cavendish Laboratory

Dr Richard Eden/Cavendish Laboratory, University of Cambridge.

Dr Eden will outline the work of his Energy Research Group, which is concerned with the Industrial Use of Energy, Energy Policy in the United Kingdom, and the International Energy Problems. The talk will include a discussion of some aspects of national and international energy prospects.

SEMINAR IN COMPUTING

Friday 21 May
11.00
Atlas Colloquium

An Overview of the 360/195

A T Lea

This talk is designed to introduce people to the Rutherford Laboratory's 360/195. The hardware/software will be described and then information given on the mode of operation and general usage.

FILM SHOW

Friday 21 May
12.40
Lecture Theatre

Francis Bacon 1944-62, and Francis Bacon - Grande Palais

Two colour films which throw some light on this controversial artist and his disturbing paintings.

HEP SEMINAR

Tuesday 25 May
14.00
R61 Conference Room

Properties of Scattering Amplitudes in Non-Abelian Gauge Theories

C E Vayonakis/Sussex.

NIMROD LECTURE SERIES

Wednesday 26 May
11.00
Lecture Theatre

Measurement of γ -Rays of ψ and ψ' at SPEAR

Dr David Aschman/Princeton

HEP DATA HANDLING SEMINAR

Wednesday 26 May
13.30
R61 Conference Room

Data Acquisition at Daresbury

P Clout/DNPL

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EXTERNAL EVENTS

SEMINAR IN THEOR. HEP/NP DEPT. OXFORD - 1430 hrs

- 21 May: Prof J Zinn-Justin/Saclay - Renormalization of the Non-Linear Sigma Model & Phase Transitions in $2 + \epsilon$ Dimensions
 24 May: Prof R Chisholm/Canterbury - The Padé Approximant Method and Some Applications.
 28 May: Dr C Sacliglu/Oxf - Exceptional Groups and Unified Gauge Theories.

SEMINARS IN ELEM. PART. PHYS/NP DEPT OXFORD - 1430 hrs

- 20 May: Dr P H Sanders/Clarendon - Weak Neutral Currents in Atomic Physics
 25 May: Dr D Aschman - Measurement of Gamma Ray Decays of ψ at SPEAR.
 27 May: Dr F Farley/Shrivenham - New Measurements of the Anomalous Magnetic Moment, the Electric Dipole Moment and the In-flight Time of the Muon.

NUCLEAR PHYSICS SEMINARS/NP LAB OXFORD - 1430 hrs

- 17 May: Prof J Cerny/LBL - Recent Studies of Exotic Light Nuclei.
 31 May: T J M Symons/Oxf - The Study of Unbound States in ^{19}F using a Cryo-Pumped Gas Target.

THEORETICAL PHYSICS SEMINAR/CLARENDON LAB - 1615 hrs

- 27 May: Prof R H Dalitz/Oxf - Bosons or Fermions.

SEMINARS IN COMPUTATION/NP LAB. OXFORD - 1630 hrs

- 20 May: Dr G C H Sharman/IBM - Basic Database Concepts.
 27 May: Mr G Brown/ICL - IDMS - the ICL Implementation of the CODASYL Database Proposals.

COLLOQUIA/CLARENDON LAB. OXFORD - 1615 hrs

- 21 May: Prof R Penrose/Math. Inst. - Singularities in Space and the Arrow of Time.
 28 May: Dr P F Chapman/Open Univ. - Energy Analysis.

LOW TEMP & SOLID STATE PHYSICS SEMINAR/CLARENDON LAB - 1430 hrs.

- 27 May: Prof R Walls/Univ. of California, Irvine & Paris - Surface Phonons and Their Interactions.

LECTURE SERIES/DARESBURY LABORATORY - 1600 hrs

- 18 May: A J G Hey/Soton - SUSW Predictions for Photons, Baryons and Mesons.
 25 May: I S Parker/Manchester - New Particles & the Colour Group.

NUCL. PHYS. SEMINAR/KING'S COLLEGE LONDON U. - 1400 hrs

- 19 May: Dr G D Jones/Liverpool - Nuclear Spectroscopy using Tensor Polarized Deuterons.

HIGH ENERGY SEMINARS/CAVENDISH LAB? CAMB. 1500 hrs

- 19 May: J N Jackson/Liverpool - High p_T Correlations at ISR.
 26 May: P D B Collins/Durham - The Pomeron - Photon Analogy.

THEORETICAL PHYSICS SEMINARS/QMC - 16.15 hrs

- 17 May: Dr P Goddard/Camb. - Solitons and Strings.
 24 May: Prof R J Elliott/Oxf - Theory of Excitations in Disordered Crystals.

HEP SEMINAR/4th. FL. SEMINAR RM., MANCHESTER U. - 1600 hrs

- 27 May: P Ditsas/Manchester - Shadowing in Photoprocesses.

THEOR. PHYS. SEMINARS/MANCHESTER U. 1 1430 hrs.

- 19 May: Dr D Sutherland/Glasgow - The Zweig Rule, the O^+ Nonet and the Oakes - Yang Problem.
 26 May: Prof L C Percival/QMC - Semiclassical Quantization of Bound States.

THEOR. & HEP SEMINARS/SOUTHAMPTON U. - 1430 hrs

- 17 May: Dr J Zinn-Justin/Saclay - Renormalization of the Non-Linear σ -Model & Phase Transitions in $2 + \epsilon$ Dimensions.
 21 May: Dr T W Burkhardt/IFF, Julich - Block Spin Renormalization Group Methods in the Theory of Phase Transitions.
 28 May: Dr J B Dainton/Daresbury - Photoproduction of Multi-Meson Systems - A Progress Report on LAMP.

THEOR. PHYS. SEMINAR/SUSSEX U. - 1615 hrs

- 20 May: Dr M V Berry/Bristol - Waves as Catastrophies

LOW TEMP. & SOLID STATE SEMINAR/SUSSEX U. - 1415 hrs

- 25 May: Dr J C A van der Sluijs/N. Wales - The Kapitza Resistance Between Metals and Liquid ^4He .

NP DIV COLLOQUIUM/CONF. RM., HANGAR 8, AERE - 1530 hrs

- 27 May: Mr S Warren/Bradford - The Role of Silicates in Archeological Studies.

THEOR. PHYS. SEMINARS/CONF. RM., BLDG 8.9, AERE - 1415 hrs

- 24 May: Dr D H Tsai/Nat Bureau of Standards - Molecular Dynamical Studies of the Energy Transport in Solids.
 28 May: Prof P Cade/Amherst, Mass., - Positron Annihilation in Solids.

OVERSEAS VISITS Mr C R Walters, to Karlsruhe, 16-20 May, for discussions on superconduction technology.

- Mr P J Houzago & Mr R Bell, to ILL Grenoble, 16-21 May, for assembly of DIIB cryosample changer & testing.
 Dr D B Thomas, to Serpukhov, USSR, 16-26 May to attend VBA Study Group Meeting.
 Mr P J Bowles, to the USA, 16 May returning mid-June, for discussions at various laboratories.
 Mr E W Fitzharris, to CERN, 17-24 May, to participate in TST tests with BEBC.
 Dr J R Smith, to Brussels, 19-21 May, to attend IBM Seminar on use of computers in Administration of Research.
 Dr L C W Hobbs, to Grenoble, 20-24 May, to attend ILL Steering Committee Meeting and a Working Group of the Steering Committee.
 Prof. F R A Hopgood, to France, 22-27 May, to attend IFIP Graphics Workshop at Blois.
 Dr P R Williams, to the USA, 22-31 May, to review progress in Disc Laser Contract, to attend Laser Engineer-

- ing and Optical Systems Conference & to visit LLL.
 Mr J Penfold, to ILL, Grenoble, 23-28 May, to test prototype polarising bender.
 Dr D Crennell, to CERN, 24-26 May, on programming for TST v and Direct Lepton Production experiment.
 Dr G E Kalmus, to CERN, 24-28 May, to attend SPSC Open Meeting; BEBC TST test runs; Direct Lepton Meeting; vTST Meeting and K_L^0 Meeting.
 Dr F J Wickens, to CERN, 24-28 May, to work on experiments S120 and WA3.
 Dr W Cameron, to CERN, 25-27 May to attend K_L^0 Collaboration Meeting.
 Dr J G V Guy, to CERN, 25-27 May, to attend TST Collaboration Meeting; report on TST experiments in BEBC and plan further work on HYDRA.
 Mr C W Trowbridge & Mr C J Collie, to Italy, 31 May - 5 June, to attend International Conference on Numerical Methods in Electrical & Magnetic Field Problems at Santa Margherita. Mr Trowbridge will give an invited paper.

Conversazione

The theme of the exhibit, mounted jointly by the Rutherford Laboratory and the UKAEA Culham Laboratory at this year's Royal Society Conversazione held at Carlton House Terrace on 6 May was 'a new system of magnetic levitation.'

Two demonstrations had been set up on the stand and the photograph (taken at the Press Visit) shows Graham Homer explaining the second of these to Mr C L Boltz, an eminent science journalist & writer.

The exhibit showed a new method for using superconductors to provide magnetic levitation ('Maglev') which offers significant advantages over other systems which have been proposed as a basis for transport development studies throughout the world.

The result of theoretical work at Culham and experiments at RL, the system provides full lift force at all speeds, eliminates electro-magnetic drag and maintains a large clearance gap between the vehicle and the track.

The demonstration attracted a lot of interest during the evening conversazione and the following



morning about 300 school children were entertained by the RS and visited the exhibits.

The Royal Society has requested the return of the Laboratory's exhibit for its soiree on 24 June.

Thanks are extended to our UKAEA colleagues for their help in this joint venture with congratulations to all the RL staff concerned for exhibiting to an extremely high standard.

The SRC Cricket Team, playing in the first round of the Civil Service Curtis Benett Shield Competition recorded a fine win over 'The Comets', a team from New Scotland Yard.

A fine sunny day at Chiswick saw the SRC batsmen in great form with Ray Smith scoring a fine 51 and partner Dave Daniels - 23. After this good start Mike Poole - 20 and Keith Latham - 9, kept the runs flowing nicely.

However, just as the Comet bowlers seemed to be taking control, they were struck by a hurricane of fine strokes and 109 runs were added in 47 minutes, 83 of these came from Ben Patel with Bob Blowfield adding a useful 25 and the innings closed after the allocated 40 overs at 230 for 7.

The Comets were in trouble right from the start of their innings losing 3 wickets for 7 runs to the fast bowling of Steve Hancock who took 2 wickets and Ian Midson, the other wicket.

After the bad start they fought back well with a stand of 90 runs, which was eventually broken by Ben Patel. From then on they never looked like scoring the runs especially when Martin Donald came on to bowl. Martin, using random trajectories (cunning people these machine physicists) finished with 4 wickets for 7 runs and the Comet's innings closed at 122 for 8. A fine win for SRC by 108 runs.

They now face OPCS Titchfield in the next round to be played at Fareham on 27 May. OPCS? - Office of Population and Census and Surveys - makes one wonder how many extra columns they have in their score book!

SRC Team:- Mike Poole/Daresbury; Keith Latham/L.O; Ian Midson/Swindon; with Ray Smith, Dave Daniels, Ben Patel, Bob Blowfield, Steve Hancock, Martin Donald, Doug House and Graham Holt from the Chilton campus.

SACKCLOTH & ASHES Apologies to George Stevens for a number of missing words. He worked at Woolwich Arsenal "throughout the last war. He joined AERE in February 1948" etc.

RAFT RACE One of the entries in this years Christian Aid Raft Race will be a joint Rutherford/Oxford Diving Club effort. The raft has been designed, using advanced hydrodynamic concepts, by Colin Walters and John Magraw and be manned by a team of six from Oxford and Rutherford. So if you have nothing very special to do on Saturday afternoon 22 May, why not come to the Abbey Meadow in Abingdon at 2.30 and support the home team.

LETTER OF THANKS Roger Mann writes

"May I express my thanks to my many friends and colleagues at the Rutherford Lab for their gifts and the splendid send-off on Friday 23 April from which I have now fully recovered. Also to say goodbye to those I did not see personally before I left".

SOCCER At one of the 3 preliminary rounds (SE Region) of the CSSC Soccer Competition, 3 of the 5 RL teams entered, qualified for the finals to be played at Poole, Sunday 23 May. The Rec Soc is running a coach for players and supporters leaving RL at 1000. Enquiries to Ron Lawes, R1.

CHRISTIAN FELLOWSHIP Friday 21 May, Bible Study on the first chapter of Colossians led by Dr B Meardon of the NBRU. The meeting commences at 12.30 in the R12 Conference Room.

Pastor Roy Chewter of the Bible Pattern Church, Newbury, will be leading the meeting on Friday 28 May and all are welcome to come along, at 12.30 in the R12 Conference Room.