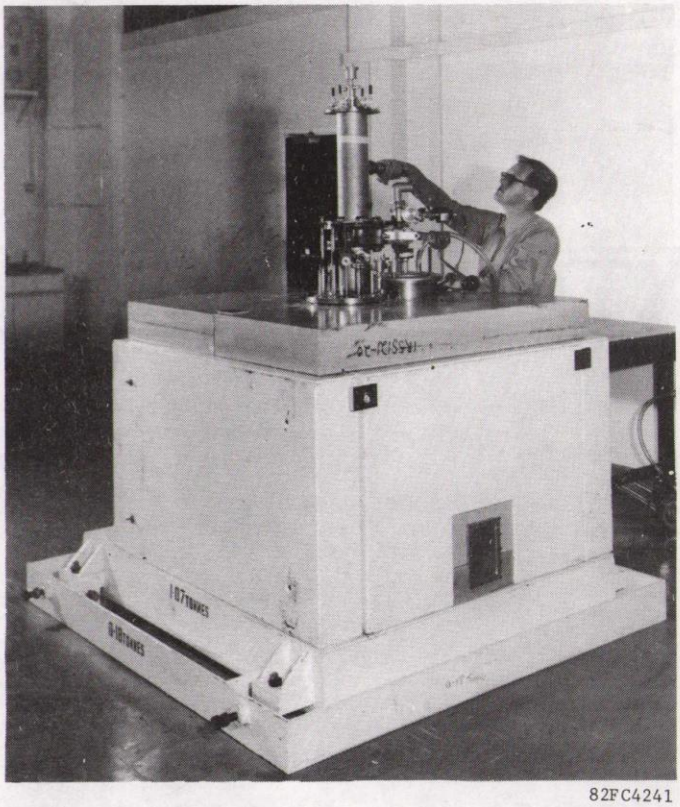
Bulletin
of the Rutherford Appleton Laboratory
22 Nov 1982 No.18

HTIS at Harwell

Recently the second SNS neutron scattering instrument has been installed on the 136 MeV linear accelerator HELIOS, at AERE Harwell. Commissioning of this instrument, the High Throughput Inelastic Scattering Spectrometer, HTIS, will commence during the next few weeks. It will enable the Neutron Division and University researchers to gain invaluable experience prior to is installation on the SNS in 1984.

The HTIS instrument is intended to provide the neutron scattering equivalent of Infra-Red and Raman specroscopy for the study of molecular vibrations. Molecular spectroscopy is one of the most valuable tools in chemistry for the analysis and understanding of the nature of the forces holding atoms together to give molecular structures. It is expected to find applications in vibrational spectroscopy of the solid phase, absorbed species and hydrogen in metals and alloys.



82FC4241

The HTIS instrument being assembled at RAL.

What it does - and how it does it

HTIS is an example of an inverse geometry inelastic scattering spectrometer on a pulsed neutron source. A "white" beam of neutrons (the incident neutron beam contains all energies emanating from the target moderator, and the particular energy range of interest is 700 millielectronvolts to a few millielectronvolts) collimated by a series of lead and boron apertures is incident on a cooled sample. Typically the samples under investigation will be cooled to liquid nitrogen or liquid helium temperatures in a purpose built cryostat. Neutrons that are "down" scattered (that is, lose energy to the internal vibration modes in the sample) to energies of less than 5 millielectronvolts are transmitted through a cooled Beryllium filter and detected by an array of 12 Boron trifloride proportional counters. The Beryllium filter energy analyser is a matrix of polycrystalline Beryllium blocks, separated by sheets of Boron Carbide in resin neutron absorbing sheets. Neutrons of energies greater that 5 millielectronvolts undergo multiple Bragg reflections in the beryllium and are absorbed by the boron in the resin sheets. Only neutrons with energies of less than 5 millielectronvolts are transmitted. In such inverted geometry spectrometers the scattered beam energy is defined (in this case by the 5 meV cutoff of the Be Filter) and the incident beam energy and energy transfer is inferred by measuring the total neutron time of flight.

The sample and Beryllium filter analysers cryostats are surrounded by an assembly of Boron carbide in resin, borax in resin and wax shielding. The flight path, before and after the sample, is evacuated, as is the shielded beam line between the source and the spectrometer. The sample cryostat has been designed for short cool down times and easy sample replacement. The Beryllium filter analyser assembly is maintained at liquid nitrogen temperatures to improve the energy discrimination.

The instrument has been designed and constructed in collaboration with Instrumentation Division.

Further developments will include the incorporation of an automatic sample changer to cope with the very high count rates on the SNS. In addition a higher resolution energy analyser will be developed for use in conjunction with the existing Beryllium filter energy analyser.

We thank Dr Jeff Penfold for news of this second SNS instrument.

INTERNAL Events

RAL LECTURE
LECTURE THEATRE - 1515hrs

2 Dec Sir Bernard Lovell, OBE,FRS, "The Origins and Development of Jodrell Bank"

NIMROD LECTURES
R61 CONF ROOM - 1400hrs

29 Nov C Michael/Liverpool 'Hadronic Spectrum in Lattice QCD.'

SAFETY FILM
LECTURE THEATRE - 1200,1240 & 1320hrs

8 Dec 'Get Well Soon'.

HEP SEMINARS
R61 CONF ROOM - 1100hrs

24 Nov Dr P Bussey/Glasgow 'Resource Production in Photon-Photon Physics'

1 Dec Dr Z Kunszt/Budapest 'Lattice QCD'.

CONDENSED MATTER SCIENCE SEMINARS
R3 CONF ROOM - 0930hrs

30 Nov A J Leadbetter/RAL 'Smetic Liquid Crystals'

14 Dec M Hart/KCL 'Bragg Reflection X-ray Optics for Synchrotron Radiation Sources'

ASTROPHYSICS SEMINARS
R61 CONF ROOM - 1400hrs

24 Nov Prof Roger Tayler/Sussex 'The Neutron and Cosmology'

1 Dec Dr Max Wallis/Cardiff 'Expectations of GIOTTO'

15 Dec Dr Paul Barr/UCL 'The UV Properties of Seyfert Galaxies'

GEOPHYSICS SEMINARS
R61 CONF ROOM - 1400hrs

23 Nov Dr P Taylor/IOS Wormley 'Evaluation of the Seasat SSMR'

14 Dec Dr D A Bryant/RAL 'The AMPTE Magnetospheric Satellite Mission'

EXTERNAL Events

NPD COLLOQUIUM
H8 CONF RM-HARWELL-1530hrs

25 Nov Dr G Dearnaley/AERE 'Science and Technology in China'

14 Dec Dr A J Illingworth/UMIST 'Thunderstorm Electricity'

TPD SEMINARS
THEO PHYS DIV - HARWELL - 1400hrs

23 Nov P C Robinson/AERE 'Modelling Groundwater Flow and Contaminant Transport through Fractured Rock'

30 Nov Dr L J Bond/City 'Advances in Finite Difference Modelling of Elastic Waves'

8 Dec Prof J R Cann/Newcastle 'Black Smokers Fuelled by Freezing Magma'

PHYSICS COLLOQUIA
CLARENDON LAB-OXFORD-1615hrs

26 Nov Prof E Amaldi/Rome 'Search for Gravitational Waves by Resonant Detectors'

ELEM PART PHYS SEMINARS
NPD - OXFORD - 1430hrs

25 Nov Dr T Sloan/Lancaster 'Virtual Photoproduction of Charm and Beauty Particles'

PHYSICS COLLOQUIA
HH WILLS LAB - BRISTOL -1700hrs

29 Nov Prof J G Taylor/KCL 'Unifying Gravity with Other Forces'

9 Dec Drs W N Cottingham & J W Alcock/Bristol 'Confinment of Magnetic Monopoles, Quarks, etc

13 Dec Prof B V Jayawant/Sussex 'Electromagnetic Suspension and Levitation'

THEO PHYS SEMINARS
QMC - LONDON - 1615hrs

29 Nov Dr M Pennington/Durham 'What Only LEAR Can Teach Us About the Hadron Spectrum'

6 Dec Dr D M Brink/Oxford 'Barrier Penetration'

THEORY GROUP SEMINARS
DARESBURY - 1400hrs

29 Nov Dr A M Lane/Harwell 'Photoionisation and Excitation of Atoms by Weak and Strong Incident Photons'

6 Dec Dr J E Inglesfield/Daresbury Plasmon Effects in Photo-emission'

SHEP SEMINARS
SOUTHAMPTON-1430hrs

26 Nov PM Stevenson/CERN 'The Renormalisation Scheme Ambiguity of Perturbation Theory - The Real Problem and Its Resolution'

PART PHYS DISC GROUP MEETINGS
BIRMINGHAM - 1615hrs

26 Nov Dr A Clark/CERN 'Results from the first UA2 pp Run'

3 Dec Dr G Ross/RAL 'Supersymmetry and SUSY GUTS'

10 Dec Dr M Houlden/Liverpool 'Status of Jets and Hard Scattering Processes'

Missing

Would anyone who can provide information concerning a missing inventory item - Hewlett-Packard Voltmeter Radiometer Type 3420B, Serial No 706-00380 please contact Roy Culliford, Ext 5204.

Trade Exhibition

Photo Fabrication Services Ltd will be exhibiting Chemical Milling and Graphic Services on Thursday 9 December from 1000 to 1600 hrs. This mobile exhibition will be located outside R20.

Film Badge Notice

It is Period 12, Colour BROWN.
Please make sure you are wearing the correct dosimeter.
Next Film Change
Monday 6 December.

RAL-School Links

An open evening at Fitzharrys School Abingdon was held on the 6 October 1982 to illustrate the work carried out by 'A' level Chemistry students during the special study section of their 'A' level course. This special study enables the student to explore interdisciplinary areas and to show flair, initiative and problem solving abilities. The areas being studied are Chemical Engineering and Biochemistry, and it is intended that such studies should open up new areas of chemical experience and to show something of the applications of chemistry in industry, medicine and agriculture, together with an indication of some social and economic aspects.

In this work valuable support has been given by local science laboratories, in particular, RAL who have provided the students with the opportunity to see how some of their laboratory project work operates on an industrial scale and ESSO Petroleum who supply some of the more expensive items on loan.

The students have been able to make some return by investigating some of the factors involved in changes in plant operation. Their work was exhibited at last summer's exhibition in Oxford of the links between school science and industry.

Acknowledgement

Vera and Neil Goodall would like to thank everyone, both at RAL and CERN for the concern shown to Len, during his illness, and the kindness shown to us in our bereavement.

Many thanks for the lifts to hospital and the home visiting. It has all been very much appreciated. Thank you for the marvellous donations everyone gave for "Sobell House".

Your friendship and kindness will always be remembered.

Database Systems

A Study weekend will be held at Daresbury on scientific database systems on 22 and 23 January 1983. Various aspects of computational methods for database management and information retrieval for scientific data will be considered. The main purpose of the meeting will be to compare and contrast a number of existing systems covering a wide range of disciplines in the physical sciences. It will provide a forum for discussion of the techniques used, the problems encountered and future development of these systems. Demonstrations of a number of interactive systems will be arranged.

The closing date for applications is 13 December. Details and application forms are available from Brian Read, RAL, Ext 6492.

RAL Lectures

THE ORIGINS AND EARLY DEVELOPMENT OF JODRELL BANK
by
Sir Bernard Lovell
Lecture Theatre
Thursday 2 December
3.15pm

Three trailers of ex-army radar equipment were towed to the botanical grounds at Jodrell Bank in December 1945 with permission to remain for 2 weeks. The idea for the proposed research originated at the outbreak of World War II. This idea was based on calculations that turned out to be erroneous and Jodrell Bank owes its existence to that original mistake and not to any preconceived plan for the development of a 'big science' establishment. The lecture will deal only with the year 1939 to 1960 by which time the large radio telescope has been built and cleared of debt.

For a Fine Idea -£500

Eight-times-winner of an RAL Suggestions Award, George McGee this time joined by Pat O'brien, has now brought his tally to nine.

On Monday 8 November, George and Pat (both skilled craftsmen in the R12 Workshop) were presented with a cheque for £500 by Dr Geoff Manning for devising a technique to make "an impossible job possible".

The problem overcome, arose when a special type of drift chamber was being constructed for the particle physicists.

The chamber has three hundred and ninety nine wires arranged in nineteen separate planes, twenty one wires to each plane. The planes are separated from each other by an accurately machined ceramic comb which positions the wires both horizontally and vertically. Each separate wire is located in an insulation block through a small ferrule, one at each end of the wire.

The construction of a chamber of this type presented several problems, especially in the handling of the 10 micron gold tungsten wire being used. It soon became apparent that unless a method of feeding the wires through the ferrules transporting them across the chamber was developed and at the same time a method devised for protecting each plane of wires from damage during the subsequent build, then the manufacture of the chamber to meet the design specification would be extremely difficult. To overcome these problems a new technique of loading the wires and transporting them across the chamber using a small bore tube and vacuum was suggested and developed. Each completed plane of wires was protected whilst the next plane of wires was under construction by a transparent guard with the capability to rise and advance as required. Both these ideas were used in the manufacture and a satisfactory chamber was completed.

Dr Manning congratulated both men on the ingenuity of their solution and encouraged those present at the ceremony to put forward their suggestions for improved techniques. He reminded them that under the Award Scheme half the savings accrued by the adoption of an idea would be awarded to the instigator.

The wire loading technique has aroused interest by those in the Lab with similar problems and should find wider applications.

George (left) and Pat (centre) receive their award and the congratulations of Geoff Manning. 82RB3341

Cheerio Jack

Jack, flanked by Ron Newport(l) and Bert Hadley(r), admire Jack's gift.
82RB5277

Before he bade farewell to RAL on Friday 29 October 'Jack' Rice had held the unusual distinction of working from the same office for 23 years. Not that this had meant stagnation - far from it, as Dr Ron Newport, making the Retirement Presentation was quick to point out.

From that office he had been in charge of the Electronics Development Laboratory, which had, over the years, come under the various wings of Engineering Division, Electronics and finally Instrumentation. The projects in which he had been involved were many and varied, his forte being the conversion of physical measurements to electronic signals. He had worked on Bubble chambers, NMR systems and superconductivity, but for the past 14 years the space programme for Oxford University (Nimbus 5, 6 and 7) and the Venus Orbiter had occupied his energies. It was greatly due to his work that the life in space of these satellites had been so long and successful, exceeding design expectation.

This sympathy for the individual requirements of the mechanical and electrical systems is a rare combination and the skill to marry them together is seldom found. His expertise will be sorely missed. "We wish him well in his retirement", said Ron Newport, "and hope we shall continue to see him from time to time"

After being presented with the 'traditional' card and a power-plane, Jack regaled the assembled multitude with tales of his long experience. Jack had obviously missed his calling as a raconteur. He concluded by thanking everyone for their help over the years and gave his last piece of advice to the young - "Collect pieces of string - when you get to my age, you'll have a ball!"

Music for Pleasure

Tickets for the 'Classics for Pleasure' series of concerts at the Albert Hall for Fridays 21 and 28 January can now be booked through Nigel Angold Ext 6508.
The Programme by the London Philharmonic includes, Overture 'Russlan and Ludmilla' - Glinka
Serenade for Strings - Elgar
Rhapsody on a Theme of Paganini - Rachmaninov
Symphony No 7 - Dvorak
Closing date for bookings 29 Nov '82.

'100' Club

The winner of the October draw of the '100 Club' was Mr R Bell of R12 who received £25. The prize winning number was No 81.

Coming Soon

An Ice Skating trip to Richmond or Southampton is planned for the New Year. If you or members of your family are interested, please contact Nigel Angold, Ext 6508.

Theatre Club

A wide variety of productions are staged at local theatres throughout the year and often price reductions can be obtained for group bookings. Transport could also be organised if enough people are interested and trips to the West End become cheaper and easier. Interested? Ring Nigel Angold Ext 6508.

Thanks

I would like to thank all friends and colleagues for the Wedgwood tea service and various kitchen items I received as wedding presents. Your generosity and kind wishes overwhelmed me. Thank you very much.
Claire Swinhoe (née Cheesmore).

Safety Film

Lecture Theatre
Wednesday 8 December
at
1200, 1240, and 1320hrs
'GET WELL SOON'

This is a brand new film and deals with office safety - it should be seen by all those engaged in an office environment,

RAL Angling Champions

This year's Championship is being fished to a new format. Instead of a single match to decide the winner, it is being fished over 3 matches. With 2 of these completed, the leading positions are as follows:-

1.	E Capocci	91b 9oz
2.	P Craske	71b 12oz
3.	D Day	71b 5oz
4.	G Kidd	71b 5oz

The final match is being fished on 20 November and as can be seen Eamon Capocci has a useful lead over his rivals. But, on the day, anything can happen - even anglers who are way down the field can have a good day and win.

Other Events

No luck for the Lab's Teams in the Civil Service Southern Area final, fished at Pangbourne, when the fish decided to go on their holidays. Only Eamon Capocci managed to find any quantity of fish and came second in his section. However, in the Civil Service National, Peter Craske managed to get among the prize winners this year - coming 8th overall.

Snooker Club

This club has recently become active in R56 using a re-covered and re-cushioned table brought from the Appleton Laboratory. It is proving to be a very popular facility, there being twenty-two paid up members. At the moment the club rules state that there is a limit of 30 members - so, anyone interested in joining must act soon. It is first come, first served. To be a member a payment of £5 annual subscription is required, plus £1 for a key deposit (refundable on termination of membership). All members must belong to the RAL RecSoc. A further £1 (also refundable) for a key to the snooker room door may be required when keys are available.

A meeting for all club members and anyone interested in joining, will be held in the snooker Room, R58 on Thursday 2 December, 1215 to 1315hrs. This will be an opportunity for all club matters to be discussed. Club members should make an effort to attend - it is the first opportunity for you to pass on your opinions on how the club is being run.

To join contact Dave Simpson, R25, Ext 6641.

Bulletin

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Deadline for insertions: