RUTHERFORD Bulletin 22

28 November - 12 December 1977

The Exhibitionists

systems '77

Britische Gemeinschaftsschau

Rutherford Laboratory

CAD-Verfahren

Das Rutherford Laboratory wird drei CAD-Verfahren herausstellen; zwei werden mit Bildschirmeinheiten vorgeführt, die einem Computer GEC 4080 aufgeschaltet werden. THESEUS ND GFUN sind entwickelt um Ingenieuren zu Konstruktionsprobleme die Finite-Elemente- zu lösen.

Computerprogramm chnet das Magnet- nem System aus ht linearen Materialien eabilität) steht. eben- er-

von THESEUS entworfen wurden, werden auf dem Bildschirm des Terminals dargestellt.

Die Manipulierung scheinbar dreidimensionaler Darstellungen, die dabei aus vielen Winkeln betrachtet werden können, ist ein wertvolles Hilfs-

SYS

für Konstrukteure und chaftler und kann zur n Betrachtung großer n ausgebaut wer-

How often one hears comments about the usefulness of pure research and whether there are sufficient practical returns from this high-cost activity. There is a general feeling that not enough effort is made to communicate the work and to explain the long-term benefits to the general public. It is pleasant to hear of developments which turn out to be useful in everyday life - whether it is non-stick pans, pocket calculators, microwave ovens, ceramic cookers, or whatever.

In the past we have been able to report on a number of developments at the Rutherford Laboratory which have been exploited in industry. In this article we describe the Laboratory's efforts to communicate by participating in two exhibitions - one involving computer applications at the SYSTEMS trade exhibition in Munich, and the second is the appearance of a model of the Laser Facility in a special laser exhibition at the Science Museum in London.

For the first time the Rutherford Laboratory has participated in an overseas international trade exhibition. SYSTEMS in Munich is the largest exhibition in Europe devoted to developments in computing and the use of computers in industry, commerce, government and other areas. The exhibition, occupying seven large halls, is sited next to the Theresienwiese - where the famous Munich Beer Festival (Oktoberfest) is held. Unfortunately this festival had finished two weeks prior to the opening of SYSTEMS '77.

The Rutherford exhibit consisted of:

- the ASPECT system, developed by C&A Division, which is a sophisticated graphics display with the ability to transform pictures into 3-D
- and design programs GFUN and THESEUS, developed by Technology Division.

Rutherford shared a stand with the National Research and Development Corporation (NRDC) and an NRDC-backed company - COMPEDA Ltd, to handle the commercial enquiries and future developments. The programs ran on a GEC 4080 computer on the neighbouring GEC stand, which was also demonstrating Computer-Aided Learning Projects. The success of the Rutherford exhibit was due to the close and helpful collaboration between these various organisations.

THESEUS is the name given to a suite of computer programs for the preparation of data in design problems using finite element analysis. The live demonstrations at a graphics terminal attracted some large audiences, and many potential customers were referred to COMPEDA.

GFUN is a computer program for solving non-linear magnetostatic problems in 3-D. It has been available

continued on p4.

INTERNAL EVENTS

NIMROD LECTURE SERIES
Monday 28 November @ 1130
Lecture Theatre

New Spin-dependent Phenomena in Electromagnetic/Hadronic Interference (including how to build a cheap high energy polarimeter).
E Leader/Westfield College

NIMROD LECTURE SERIES
Monday 5 December

See Notice Boards

TRADE EXHIBITION
Monday 5 December
0900-1600
R1 Foyer

Key Med will be demonstrating their range of internal inspection instruments - rigid endescopes, capable of penetrating holes as small as 1.7mm, to flexible fibrescopes which enables the user to inspect inaccessible areas - inside plant, engines, components, pipes etc and to photograph the areas by 35mm, polaroid or TV cameras.

NIMROD LECTURE SERIES
Monday 12 December @ 11.30
Lecture Theatre

A New Tool for the Study of Fundamental Interactions: Parity odd Correlation in Quark Fragmentation.
Professor O Nachtmann/Heidelberg

EXTERNAL EVENTS

MANY BODY SOLID STATE PHYS SEMINAR/CLARENDON - 1430 hrs.
1 Dec: Dr M Prasad - Cyclotron resonance in two-dimensional systems.

THEORETICAL PHYSICS SEMINAR/CLARENDON, OXF - 1615 hrs.
1 Dec: Prof D Paul - Ferromagnetism - an exercise in non-linear differential equations.

NUCLEAR STRUCTURE SEMINAR/NP DEPT, OXF - 1430 hrs.
28 Nov: Prof J A Nolen/Michigan - Mass measurements of exotic, and other nuclei.

ELEMT PARTICLE PHYS SEMINARS/NP DEPT, OXF - 1430 hrs.
1 Dec: Prof V Stenger/Hawaii - Prospects for the detection of ultra high energy extraterrestrial neutrinos.
5 Dec: Dr C H Llewellyn Smith - Predictions from quantum chromodynamics for large PT production in strong, weak and electromagnetic processes.

SEMINAR ON THEOR ELEMT PART PHY/NP DEPT, OXF
2 Dec: Dr P Senjanovic - Two dimensional gauge theories: dynamical surface variables, the axial anomaly, Lorenz invariance.

PART PHYS DISCUSSION GROUP/BIRMINGHAM UNIV - 1615 hrs
9 Dec: Dr M Green/Westfield - Recent results on $\pi\pi$ scattering from "Ω".

PHYS & GEOPHYSICS COLLOQUIA/BRISTOL UNIV - 1700 hrs.
28 Nov: Dr J Malos - Particle physics in the sunshine
5 Dec: Prof M J Disney/Cardiff - Are galaxies icebergs.

THEORY GROUP SEMINAR/DARESBURY LAB - 1400 hrs.
28 Nov: Dr D Brink/Oxf - Proximity potentials for heavy ion reactions.

HEP SEMINAR/MANCHESTER UNIV - 1615 & 1415 hrs respectively
30 Nov: P G H Sandars/Oxf - Unification of the weak and electromagnetic interactions and the search for parity nonconservation in atoms.
6 Dec: H Bingham/LRL, RL - Review of neutrino experiments.

THEORETICAL PHYSICS SEMINAR/MANCHESTER UNIV - 1430 hrs.
7 Dec: Dr C Hodges/Daresbury - Why do metals form alloys?

THEORETICAL PHYSICS SEMINAR/QMC - 1615 hrs.
28 Nov: Dr C J Isham/IC - Quantum field theory in a curved space-time.

NUCLEAR PHYSICS SEMINAR/SURREY UNIV - 1415 hrs.
30 Nov: M A Nagarajan/Daresbury - Some aspects of heavy-ion transfer reactions.

ELEMT PART PHYSICS SEMINARS/WESTFIELD COLLEGE - 1400 hrs.
30 Nov: Dr M Green - Recent results on $\pi\pi$ scattering from "OMEGA".
7 Dec: Dr R Ansorge/Cavandish - The annihilation effect in $p\bar{p}$ interactions at 100 GeV

NUCL PHYS DIV COLLOQUIUM/CONF RM, H8, AERE - 1530 hrs.
1 Dec: Dr G Stirling - The Spallation Neutron Source (SNS).

THEOR PHYS SEMINAR/CONF RM, BLDG 8.9, AERE - 1400 hrs.
29 Nov: Dr R Jones/Exeter - Electronic states associated with edge dislocations in germanium and silicon.
6 Dec: Dr J Reynolds/Culham - The JET project.

CORRECTION The date for completion of the R1 glazing operation is the end of February and not the over optimistic date given in Bulletin No 20.

OVERSEAS VISITS Mr A R Mortimer and Mr W T Smith, to DESY, Hamburg, 28-30 Nov, to attend Jade Collaboration Meeting.
Mr B F Colyer, to Bonn, West Germany, 28-30 Nov, for discussions on proposed SRC radio-telescope and to attend Workshop on proposed 30 in telescope for Max Planck Institute.
Mr P L Davidson, to ILL, 28 Nov-1 Dec, for tests of scintillation detector on Canal technique.
Dr M W Johnson, to ILL, 27 Nov-6 Dec, to carry out approved experiment.
Mr A L Walton and Mr E C Gibbs, to CERN, 30 Nov-2 Dec, for discussions on Bessymatic Film Measuring Machine design.
Dr R C Hwa, to CERN, 1-9 Dec, for discussions.
Dr L C W Hobbis, to Paris, 2 Dec for one day, to attend ILL Steering Committee meeting.
Dr M R Jane, to CERN, 5-7 Dec, to attend workstation users meeting and to hold discussions.
Mr J Jenkins, to DESY, Hamburg, 5-7 Dec, for discussions.

SALES TO EMPLOYEES Sales of scrap metal/plastics as set out in RLN 12/73 will be made on 2 and 16 December.

NATIONAL SAVINGS Salaries cycle 18 ending 30 November 1977. Certificates will be ready for collection on Thursday 1 December at the Cash Office R20.

Any monthly paid employee wishing to join the scheme or to change the amount being deducted from their salary, please fill in a savings form (obtainable from the Cash Office R20) as soon as possible.

FILM BADGE NOTICE Period 13 commences Monday 28 November, Colour Strip - RED for ßeta Gamma film and neutron packs.

Please change your films promptly and return all old ones.

Six monthly dosimeter change for people with surnames commencing W X Y and Z.

MAIL ADRIFT? A letter has been received from the French Embassy London in reply to an enquiry made from someone at the RL about a French magazine!

It can be collected from the Editor, Room 42, R20. The magazine in question is "Science et Vie".

Chairman's Visit

International Collaboration Featured in Physics Apparatus Group Display

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Above: The construction of the single-gap cylindrical multiwire proportional chamber, (now undergoing tests) is described to Professor Allen by Gordon Walker, Head of the Physics Apparatus Group. The chamber is a prototype of a 4-gap chamber, now being built for the TASSO collaboration experiment on PETRA at DESY, Hamburg.

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Right: Jim Wells discusses with Professor Allen the types of flux used in soldering the 20 micron diameter gold-plated tungsten sense wires onto the large drift chambers for the CERN Muon Experiment.

TRADE EXHIBITION AT AERE

Automatic System Laboratories Ltd one staging an exhibition of instrumentation and measuring techniques on Tuesday 29 November, 1000-1600 hours in the Cockcroft Hall Conference Room. On display, high precision linear displacement; measurement system; 750°C capacitance strain gauge; automatic creep-strain measurement using 'SVVC's; high precision resistance thermometry etc. ASL personnel will be on duty.

CHRISTIAN FELLOWSHIP

Modern biology is showing increasingly that insects, animals and plants have long made use of devices we regard as examples of modern invention. A fact and Faith film entitled Prior Claim showing amongst other things carnivorous plants, diving spiders, from that shoot and beautiful pictures of acrobatic birds on Midway Island will be shown in the lecture theatre on Friday 2 December. The film lasts for approximately 30 minutes and all are welcome.

9 December: Prayer meeting led by Frank Smith in the R2 Conference Room at 1230 pm. All are welcome to join us. If you have any requests for prayer please contact any member of the Fellowship.

HARWELL FILM SOCIETY

Tuesday and Wednesday, 6 and 7 December at 1945 hours in the RL Lecture Theatre. 'Distant Thunder' - (Satyajit Ray) Ray's depiction of the Bengal famine of the early forties shows the effects of this wartime cataclysm in which over five million died by focussing on one family in particular. An amitious young Brahmin has established himself, through a little learning, as the village headman. Gradually, as the food gets scarcer, his position becomes untenable. Though initially humiliated when his wife betrays her caste by doing manual work to earn rice, he ultimately acquires an awareness of their true status as human beings and when the situation demands, his willingness to break the taboo of caste is unhesitating. *(India, 1973).*

CPSA

The AGM will be held at 1215 hours, 6 December in the Atlas Colloquim.

LIVE ORGAN MUSIC IN LECTURE THEATRE

Jonathan invites you to another informal session of organ music with a Christian flavour. Come and listen or join in at 1230-1330, Friday 9 December in of course, the Lecture Theatre.

HORTICULTURAL SOCIETY LECTURE

The next lecture is at 1930 on Monday 5 December in the Lecture Theatre.

Mrs Alex Graham will be talking about, and demonstrating the art of Floral Arrangements with a Christmas theme. Entrance fee 25p. Pot plants and other prizes will be raffled.

We hope to have a return visit from Ken Burras from the Oxford Botanical Garden early in the New Year, his subject is expected to be 'The Amazon'. More details later.

SOCCER

The Rutherford Soccer Championship for 1977-78 was won, for the fourth year in succession, by the CA team consisting of Jeff Bizzell, Malcolm Edwards, Martin Guest, Derrick Hill, Ron Lawes, Denis Stock, Jim Taylor and Dave Thorpe. The competition was based on a "home and away" league system, the final results being shown in the table below.

TEAM	PLAYED	WON	DRAWN	LOST	GOALS FOR	GOALS AGAINST	POINTS
CA	6	6	0	0	32	7	12
ATLAS	6	3	0	3	11	15	6
NOMADS	6	2	1	3	11	15	5
HEP	6	0	1	5	7	23	1

at Rutherford for five years and has already been exported to eleven laboratories in Europe and America. The Rutherford people are acknowledged as being among the world leaders in the application of computational techniques in the calculation of magnetic fields.

Live demonstrations were also given on the ASPECT system using somewhat imaginative line drawings of structures designed by THESEUS - a North Sea oil rig and the Frauenkirche (cathedral) at Munich - as well as a protein molecule and examples using high-energy physics data.

The exhibition was well attended with people crowdin round the stands - keeping the exhibitors on their toes at all times. Considerable interest was shown by many visitors at the Rutherford stand, the stack of explanatory leaflets was exhausted and more than 30 people contacted COMPEDA for commercial details. In the words of one of our exhibitors, "the experience was exhausting but fascinating!"

THE laser EXHIBITION

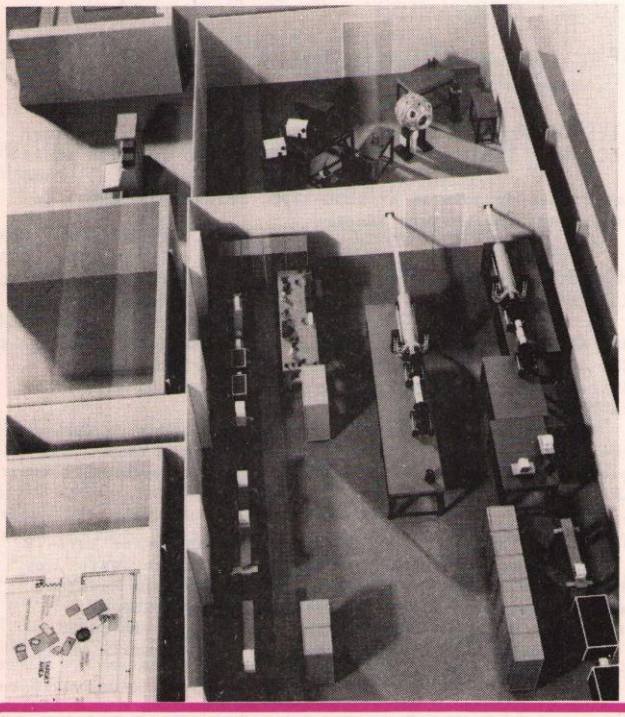
From November 1st 1977 – January 31st, 1978
Monday–Saturday 10am–6pm
Sunday 2·30–6pm.

The Science Museum, Exhibition Road, SW7.

Since the first laser was built in 1960, the applications of these intense light beams have grown considerably and they are now widely used in the fields of science, commerce, defence, communications, and even in the world of entertainment. But how many people actually know what a laser is, and what it is used for?

To help answer these questions, a special LASER EXHIBITION opened at the Science Museum on November 1st to highlight the use of lasers in pure research and to outline the various applications.

The research interest is demonstrated with a model of the Rutherford Laboratory's Central Laser Facility - the highest power laser (in an unclassified laboratory) in Western Europe. The model is an exact replica of the installation, to scale 1/15, showing the laser source, the target area and control room. The model is complemented by an attractive display of colour photographs of the installation.



In addition, the exhibition shows many aspects of the laser, its development and applications. There are many exhibits which can be operated by the public, such as cutting and welding using an industrial laser. (The mod tailors even cut their suits using lasers nowadays!). One can also have some target practice using a "laser marksman".

Powerful lasers, such as those featuring in James Bond movies, can certainly kill but are rather inefficient energy converters. The more important military applications lie in range-finding and target identification. There are many uses in the construction industry for alignment purposes (such as for aligning the magnets in a new accelerator). The police use lasers for fingerprint analysis, anti-burglar devices, etc.

Lasers are used to transmit speech and pictures, to produce moving 3-D laser pictures (called holograms), and in surgery. All of these various applications are demonstrated in the exhibition.

The laser exhibition has been well attended, in spite of the power cuts and the entrance charge of 75p (45p for children), and runs until January 31st. It has received wide publicitiy on the radio, in the press, and has featured in several TV programmes including Blue Peter, News At Ten and Multi-Coloured Swap Shop.

The Rutherford Laboratory has gained considerable experience from participating in these exhibitions and it has provided much satisfaction in being able to communicate these aspects of our work to the general public. We look forward to further participation of this kind in the future.

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Editor: H F NORRIS
Room 42 Building R20
Rutherford Laboratory
Chilton Didcot Oxon OX11 0QX
Abingdon (0235) 21900 Ext 484

Deadline for Insertions

1000 hours Tuesday 6 December