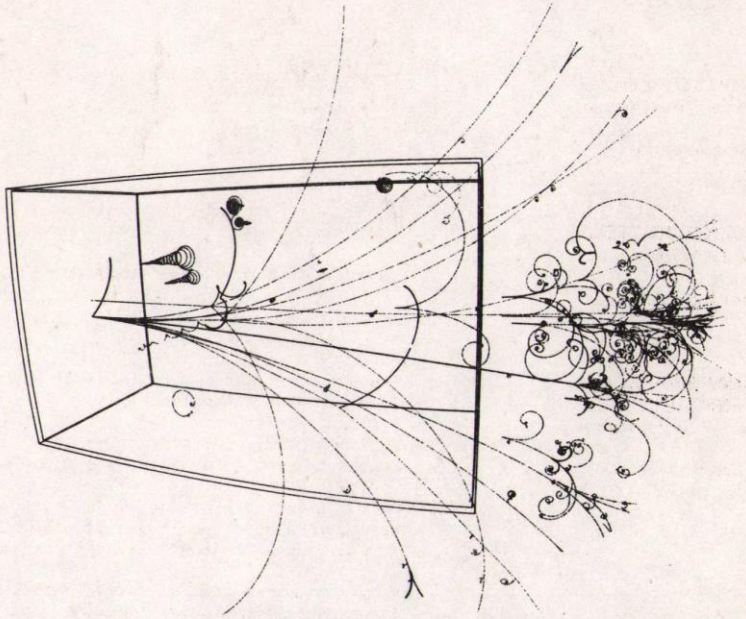
Rutherford Laboratory

bulletin 15

13 -27 September 1976

Simulation Technique Aids Experimenters



To assess the difficulties involved in carrying out proposed high energy physics experiments, the RL Bubble Chamber Research Group has devised its own method of simulating results by computer. This enables the data teams to get used to the sort of material which will be produced - without having to do any experiments at all!

The photograph shows the kind of particle tracks which can be simulated by the computer and produced photographically by the FR80 microfilm recorder.

The production rates of 'prompt' electrons and muons - events where the particles appear to come directly from hadron reactions - have been found to be much faster than would be expected on the basis of conventional models of vector meson decay and direct pair production. To look into this, an experiment to detect prompt electrons has been proposed for a 70 GeV π^- beam at CERN using a track-sensitive hydrogen target mounted inside the large BEBC bubble chamber.

BEBC contains a neon-hydrogen mixture in which electrons lose most of their energy by radiation, so forming electron showers and enabling these particles to be easily distinguished from the heavier pions, etc. However spurious 'background' counts could be picked up where only one electron is detected in a Dalitz pair or from the decay of a K-meson which could reduce the reliability of the prompt electron signal. These spurious counts could be identified by taking measurements on the particle tracks.

The RL Bubble Chamber Research Group has developed a computer simulation technique to produce 'events'. This will measure the efficiency of the bubble chamber for detecting true prompt electrons and indicate just how serious the problem of spurious counts is.

The technique uses the Laboratory's FR80 microfilm recorder - itself computer-controlled - to produce film of computer simulations of bubble chamber interactions. Preliminary results from this film show that the detection of prompt electrons in BEBC is quite feasible - the detection efficiency being about 90 per cent.

The program used on the Laboratory's main IBM 360/195 computer is divided into 2 parts. The first generates the positions of the 'bubbles' in space and the second projects these onto any of the five film planes. These projections are then transferred onto magnetic tape ready for input into the FR80, which in turn produces the actual 35mm film for scanning. 'Bubbles' on some 10,000 track segments, each small enough to produce a smooth outline to the final particle trajectory, are generated for each event, which typically can produce 350 particle trajectories and 150 event vertices.

Film for a simulated 40 GeV π^- experiment with 1-3 particles per burst was produced and scanned on two views. 'Prompt' electrons were to be seen from Dalitz pairs and from the decay $e \to e^+ e^-$ as well as from the decay of a charmed meson of mass 2.02 GeV. The identification of these different types of electrons was very good, and the results from this computer simulation project show that single prompt electrons coming from hadron reactions can be identified with almost complete certainty. Further film was generated with a 70 GeV beam and showed little deterioration in scanning efficiency.

To check the accuracy of the scanning, a special colour film of the bubble chamber simulations was produced in which electrons show up as yellow tracks, hadrons as white, strange particles as purple and mu-mesons as blue!

YOUR BLOOD IS SOMEONE ELSE'S LIFE

The National Blood Transfusion Service is visiting the Laboratory on Monday and Tuesday, 13 and 14 September. Regular donors will have been notified of appointment times; new donors are accepted, indeed welcomed, at any time between 1100 and 1200 and 1330 and 1500. Remember a hospital patient somewhere is in need of blood every half minute of the day and night.

NATIONAL SAVINGS CERTIFICATES

Monthly cycle ending 31.8.76 - certificates can now be collected from the Cash Office, R20. New members wishing to join the Scheme can obtain enrolment forms from the Cash Office.

Wages cycle ending 11.9.76 - Certificates can now be collected with effect from 13 September, from the Cash Office, R20. New members wishing to join the Scheme can obtain enrolment forms from the Cash Office.

INTERNAL EVENTS

NIMROD LECTURE SERIES
Monday 13 September
11.00
R12 Conference Room

Data on Production of Charmed Baryons from Fermilab

Dr I Gaines/Fermilab

SPECIAL LECTURE
Tuesday 14 September
11.00
R12 Conference Room

Scattering Processes at Extremely High Energy

T T Wu/Harvard and CERN

NIMROD LECTURE SERIES
Monday 20 September
11.30
Lecture Theatre

Omega Past and Future

Dr D Treille/CERN

NIMROD LECTURE SERIES
Monday 27 September
11.30
Lecture Theatre

J/ψ Production in Hadron Collisions

Professor A Donnachie/Manchester

195 COMPUTER GROUP REPRESENTATIVES MEETING
Tuesday 28 September
0930
R61 Conference Room

The program and timetable for this all-day meeting is as follows:-
0930 : General Meeting
1030 : Coffee
1045 : ELECTRIC - discussion of future facilities
1215 : Category sessions (in parallel)
1245 : Lunch
1400 : The move of the 195 - configuration capability, timetable.
1430 : Reports from 195 Advisory Committee.
1445 : Work Station Session in parallel with Category Representatives Session.

Notes for the meeting including the ELECTRIC suggestions list will be sent to representatives before the meeting. Queries to P J Hemmings Ext 552.

REMAP — Volunteers Needed

Within the broader scope of the British Council for the Rehabilitation of the Disabled, there has been established an organisation known as Rehabilitation Engineering Movement Advisory Panel (REMAP), which aims at harnessing the voluntary services of engineers who in collaboration with medical and social service department staff, endeavour to produce for local handicapped people "aids to living" that are not commercially available. The objective is to improve the quality of life for the handicapped and enable them to live life as normally as possible with the minimum help from others and thus to foster in them the will to play a full part in society.

REMAP functions nationwide, through the creation of local panels to receive, usually via the relevant Social Services Department, but also from hospitals, problems of the physically disabled which have proved difficult or have not been resolved by the utilisation of existing resources.

Local REMAP's are backed by a support group of volunteers recruited locally from men or women with particular qualifications or skills who are willing to be called upon when a specific task appears to the Panel to require their advice or assistance. The support group includes engineers, draughtsmen, technicians and craftsmen from all branches of the Engineering and construction trades.

The effort expended by the local REMAP and its support group is voluntary and will be free of charge. The manufacture of a piece of equipment may, however, require expenditure upon materials, tools and the use of facilities. Such charges will normally be recovered from the relevant Social Services Department and will include a small overhead to cover travelling and minor administrative costs.

If any RL staff would be prepared to offer an hour or so of their own time on a voluntary basis to help REMAP scheme, will they please submit to Mr P J Bowles, Building R.1., their names together with a brief statement of the particular qualification or skills which they wish to offer. A number of our engineers are already working with the local REMAP but there is a need for further volunteers, particularly technicians and craftsmen.

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TRAFFIC MOVEMENTS DURING OUTMUSTER The traffic pattern for the outmuster period set out in RL Circular 19/72 is designed to reduce hazards, give priority to buses, and speed up movements away from the laboratories. Motorists who disregard this pattern do so at the expense of their colleagues.

Drivers going north must use the Library Avenue exit. Drivers going south, or east towards Hagbourne should use the bollard exit near Frome Road, where they should "filter one-for-one" until bus departure time. Drivers approaching from Frome Road are reminded that at that time they must stop and give way to cars remaining on Perimeter Road. This is to clear the route for southbound buses, which must also be allowed priority at the bollards.

Residents heading for the Chilton Estate must either approach along Frome Road, or take their turn in Perimeter Road. Overtaking on Perimeter Road is dangerous during outmuster.

CERN FELLOWSHIP Details on CERN Fellowships during 1976-77 are now available from Mrs R Jeans, Personnel, R20. Scientists wishing to work at CERN can apply under the following schemes:- Fellowships, Scientific Associateships, Corresponding Fellowships and Travelling Fellowships.

LIFEBOAT FUND The recent collection for the Civil Service and Post Office Lifeboat Fund raised £37.11. Many thanks to those who contributed and to those who helped with the collecting.

SAVE ON XEROX Did you know that Xerox copying costs the Laboratory over £25,000 a year? Use the machines wisely and help cut Xerox costs.

- Don't overestimate the number of copies you need.
- Carbon paper is still available. It is cheap and can be used over and over again.

MISSING EQUIPMENT Would anyone with any information on the present whereabouts of a Stopwatch, Serial No. 57/0177, please contact the Inventory Section, Room 48, R20.

SALES TO EMPLOYEES Sales of scrap metal/plastics as set out in RLN 12/73 will be made on 24 September, 8 and 22 October.

OVERSEAS VISITS K C T O Sumorok, to CERN, 12-24 September, to work on software for Omega experiment.

D R S Boyd, P E Bryant, B J Charles, F Hart and M W Waters, to Montpelier France, 12-25 Sept, to attend CERN School of Computing.

N D West, to Canada, 13-18 Sept., to attend 1976 Proton Linear Accelerator Conference at Chalk River, Ontario.

The Director, to CERN, 15-16 Sept., to attend CERN Committee of Council Meeting.

M N Wilson, to the National Magnet Laboratory, M.I.T., USA, on 15 Sept for one year, to work on applied superconductivity problems in connection with the U.S. energy programme.

I Lisney, to CERN, 19-22 Sept., to work on Omega on-line software.

H Hurst, M Curtis, T G Pett, to West Berlin 18-24 Sept., to attend SEAS Anniversary Meeting, H Hurst & M Curtis will also attend SEAS Executive Board Meeting.

S M Fisher, A W Robertson & C Sutton, to Yugoslavia, 19 Sept - 3 Oct., to attend International School of Elementary Particle Physics at Basko Polje.

L C W Hobbis, to Vienna, 20-22 Sept., to take part in the Western European High Flux Neutron Source Discussions at IAEA.

J B Forsyth, to ILL Grenoble, 20-28 Sept., to carry out approved experiment.

R G Roberts, to the USSR, 24 Sept - 3 Oct., to give lectures at Dubna Summer School.

C J S Damerell, to CERN, 27 Sept - 21 Oct., to work on WA 3 Experiment.

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

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Deadline for Insertions 1000 hours Tuesday 21 September.

Retirement Rings Many Bells

AERE Harwell was founded in 1946 with Sir John Cockcroft as its first Director. During the next few years its growth rate, both in staff and experimental facilities was to say the least, rapid. GLEEP, the establishments first reactor was in operation by 1947 and BEPO in 1948. Also in 1946, Dr T G Pickavance was invited to lead a group to construct the 110 inch cyclotron which was completed on Friday 2 December 1949. Following a period testing and development the first operational beam was obtained in 1950, the maximum energy being about 150 MeV eventually to be raised to 180 MeV.

On Tuesday, 6 December 1949 the 'Press' heralded the previous evening's announcement by the Ministry of Supply with such headlines as "NEW MACHINE TO SMASH THE ATOM" (Daily Graphic) - "BRITAIN'S BIG NEW ATOM MACHINE IS 'A REAL SMASHER'" (Daily Mirror) and, "BRITAIN GAINS 2 YEARS IN PEACE-ATOM RACE" (Daily Herald).

In a much more sober manner, Nature, 21 January 1950, carried an article on 'The Harwell Cyclotron' the authors being T G Pickavance, J B Adams and M Snowden. Readers may be interested in a very small quote from this, concerning the machine's future programme - " ... similar work will be done with cloud chambers. These very high energy machines ..." !!

It was into this exciting new world of 'high energy' physics that Frank Uridge was plunged when he arrived at Harwell on 1 August 1950 - a rather different world from his previous occupation of operational research on air traffic control in the London area. Frank recalls his first day in the cyclotron group and John Adams, now the Executive Director General of CERN, in a white lab. coat doing calorimeter measurements.

By 1953 Frank was carrying out measurements of radial oscillations, followed in 1954 (or was it '55) by neutron-proton scattering experiments using a diffusion cloud chamber working with Tommy Randle and joined later by Mrs Dorothy Skyrme. Later he was to work with Godfrey Stafford and Colin Whitehead on n-p polarisation experiments.

Before leaving the 'cyclotron days' it is interesting to recall the names of some of the other people working in that group during the 50's:- Jimmy Cassels, Herbert Whitby, Eric Taylor, Basil Rose, Mike Cheshire, John Dickson and Dave Salter; amongst the research students who worked on the cyclotron were Bob Voss and John Thresher.

By 1957, Dr Pickavance had been appointed Director of the RL and Dr Stafford had moved over to lead the group constructing the Proton Linear Accelerator. Before Frank joined the Lab in about 1958 he paid his first of many visits to CERN. The equipment for this first UK experiment on the CERN 600 MeV synchrocyclotron came from Harwell and Frank and lorry driver set out on the long drive to Switzerland where he was joined by Dr Stafford. This was two years before the CERN PS was working and the people travelling this way became known as 'truck teams'.

On his return from this first experiment Frank joined the PLA group and when the machine became operational (at 30 MeV) in 1960 he became the PLA's liaison officer with university teams. In addition he was concerned with the organisation of experimental facilities including setting up the first counting room. He continued in this field until the final shutdown of the accelerator in October 1969. His final period at the Lab has been as a member of a team working on the π10 and then the K17 experiments.

Having opted for premature retirement, Frank left at the end of August and it was very appropriate that Chris Batty a close associate since 1959, made the farewell presentation. In an amusing speech Chris said that of course we had not seen the last of Frank as he had promised to come back and perform the opening ceremony for the new super-loo in R12. He wished Frank a long and happy retirement and on behalf of friends and colleagues presented him with a 'workmate'.

Frank sends his thanks to all who generously contributed to his gift on retirement and apologizes to those he was unable to see and say goodbye to personally.

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HELLO SAILORS Budding yachtsmen here is your chance - 'Sail for the SRC' in the 1976 CSSA Interdepartmental Offshore Race.

The CSSA is organising another Interdepartmental Offshore Race for the weekend of the 1st to 3rd October 1976. This is the fifth such race, and the SRC has been represented each year. Last year nine departments entered a total of fifteen yachts, with the Department of the Environment winning first prize in an exciting race from Portsmouth to Cherbourg.

This year's event will again be from Portsmouth to Cherbourg, subject to weather conditions, starting on Friday, 1 October at 1700 hours. Alternative courses will be sailed in the Solent area in the event of bad weather. Special leave and travelling expenses are available.

The SRC Sailing Secretary, M.P.M. Hall, Appleton Laboratory, Slough 44234, Ext. 328, would be glad to hear as soon as possible from anybody wishing to be in the SRC crew, and from anybody able to offer a suitable boat! If there are sufficient numbers it may be possible to enter two crews again.

The local contact is Peter Craske on Extension 232.

CHRISTIAN FELLOWSHIP On 17 and 24 September, John Thomas will be leading a further study on the letter of Paul to the Colossians. All are welcome to come along, at the usual venue, R12 Conference Room at 12.30.