RUTHERFORD Bulletin 16

11 - 25 September 1978

A GOOD WEEK FOR DRIFT CHAMBERS

Drift Chambers are a type of detector used in Particle Physics experiments to measure the exact positions of charged particle tracks. The basic technique was pioneered in the early 1970s and is now widely used in large-scale experiments around the world. During the first week in September two events at the Laboratory brought 'Drift Chambers' to the fore in coffee break discussions and provided much satisfaction to those involved in this area of work at the Laboratory.

* * *

Final Drift Chamber for EMC

Since 1976 the Laboratory has been heavily committed to the construction of 12 large area drift chambers for the muon scattering experiment at CERN. The work-load has been divided between several groups from the Instrumentation and (former) Nimrod Divisions. There was much excitement in August last year (see Bulletin 18, 1977) when the first chamber was finished and shipped to CERN.

These chambers have already been used successfully in the first experiment using the 280 GeV muon beam, but the experimenters have eagerly awaited the arrival of the last 'W7' chamber as data-taking with a hydrogen target has just commenced.

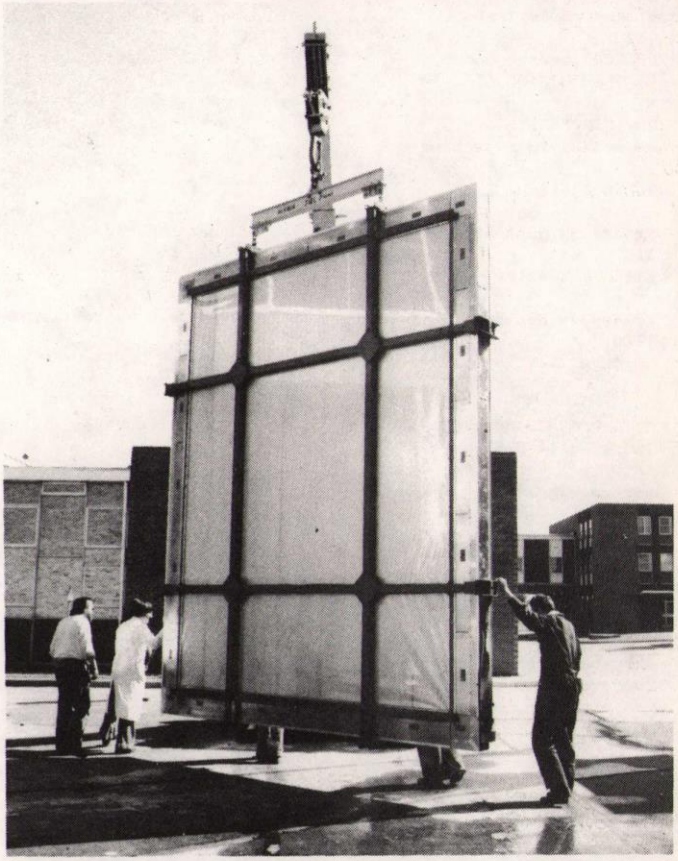
On 1 September the last chamber was completed and shipped off to Geneva, and we have just learned that it arrived safely! Many thanks are due to the engineers and craftsmen whose dedicated efforts have brought this project to a successful completion.

* * *

Bright Idea Rewarded

The Laboratory has been receiving hundreds of single-wire drift chambers made by Manchester University and assembling them onto final support frames for the JADE experiment. Mr Ray Croucher was working with his fellow craftsmen at the Laboratory on the assembly of these modules when *he had an idea*. He then devised an improved method for the assembly using a simple setting bar. This removed the need for making several brackets achieved the required accuracy in a shorter time and ensured that the chamber modules were handled gently to avoid damage to location buttons.

This bright idea resulted in Ray being presented with a cheque for £250 under the Suggestions Award Scheme. The Director, in congratulating Ray, commented that the fabrication of sophisticated apparatus was a crucial part of the Laboratory's involvement in High Energy Physics. The work needs to be performed to the highest standards, to be completed within a rather tight time-scale and to work reliably. These important activities provide a challenge to both the designer and the craftsman.



The final W7 drift chamber (size 4.5m by 3.5m) during the preparation for its shipment to Geneva.

The Director presents a cheque to Mr Ray Croucher on behalf of the Suggestions Award Scheme.

INTERNAL EVENTS

NIMROD LECTURE SERIES **Thursday 14 September** **1130** **R1 Conference Room 1**	**Report on Tokyo Conference** *Drs H M Chan and P J Litchfield (Rutherford)*
Monday 18 September **1130** **R27 Colloquium**	**Report on Tokyo Conference** *Drs C J S Damerell and R J N Phillips (Rutherford)*
Monday 25 September **1130** **R61 Conference Room**	**The Quark Parton Model** *Dr F E Close (Rutherford)*
HEP SEMINARS **Wednesday 13 September** **1100** **R61 Conference Room**	**Meson Radiative Decays** *Dr A M Kamal (Edmonton)*
Friday 22 September **1100** **Lecture Theatre**	**To be announced**
Friday 29 September **1100** **Lecture Theatre**	**Towards a Systematic Description of a Heavy Quark System in QCD.** *Dr P Senjanovic (Oxford University)*
RUTHERFORD LABORATORY LECTURE **Thursday 14 September** **1515** **Lecture Theatre**	**Alternative Energy Sources** *Dr F J P Clarke (Harwell)*

EXTERNAL EVENT

THEORY GROUP SEMINAR **Wednesday 20 September** **1400** **Daresbury Laboratory** **Conference Room 3**	**Medium Energy Proton Reactions from Light Nuclei** *Dr J Comfort (Univ. of Pittsburgh)*

RUTHERFORD LECTURE

The next lecture in the series entitled "Alternative Energy Sources" will be given by Dr F J P Clarke, Research Director (Energy), Harwell, on Thursday 14 September at 1515 hours in the Lecture Theatre.

Among the alternatives to oil, gas, coal and uranium as sources of energy, are the sun, wind, tides and geothermal heat. Dr Clarke will discuss the problems of harnessing these sources and the following questions for the UK will be asked:
How much contribution can we expect from each? How soon? Are they economic?

INTERACTIVE COMPUTING COLLOQIUM - 10 NOV 1978

The Laboratory in collaboration with IEE, is to hold a Colloquium to present interactive computing to engineers in Industry.
The Colloqium is part of the IEE normal programme of events, and it is expected that representatives from Industry, with wide interests will be present.
For full details and application forms contact Mrs M Sherwen (Ext. 553)

HOSPITAL SATURDAY FUND

This is a non-profit making benefit society sponsored by the Civil Service whereby a small weekly contribution entitles members to sickness benefit. Mr Atkins will be in the foyer of the Restaurant from 1115 to 1345 on Wednesday 20 September to give information about the scheme.

FILM BADGE NOTICE

It is Period 9. Colour Strip BLUE for beta-gamma films.
Next Film Change - Monday 11 September.
Please note that all 6 monthly dosimeters should have been returned.
Any inquiries to Mrs J A Coates R2. Ext. 430.

OVERSEAS VISITS

Mr P F Coleman to CERN from 11 - 15 September to look at housing & finance at CERN

Mr J W Burren to Brussels from 11 - 12 September to discuss STELLA experiment

Dr G H Stafford to CERN from 12 - 15 September to attend meetings of CERN Scientific Policy Committee, Finance Committee, Committee of Council and Programme meeting.

Dr D J Crennell to BOLOGNA from 13 - 16 September, to WA30 Collaboration Meeting.

Dr G E Kalmus to BOLOGNA from 13 - 17 September to attend WA30 Collaboration Meeting and to DUBROVNIK September 17 - 25 to participate in the summer school.

Dr J M Valentine to ILL and CERN. 14 - 24 September for discussions.

Dr C J Hardwick to DUBROVNIK from 17 September - 1 Oct. to attend Summer School.

Dr F O'Neill to CHICAGO from 18 - 22 September to attend Fusion Laser Meeting.

Dr M A R Kemp to CERN from 18 September - 3 November, to work on the e-gamma experiment.

Messrs A L Lintern and P D Wroath, to DESY, from 18-22 September, to work on the TASSO experiment.

Messrs R Croucher, K Miles and L Phillips to DESY, from 18 - 29 September, to work on the JADE experiment.

Prof F R A Hopgood, to BOLOGNA, from 23 - 29 September, to attend Graphics Standards meeting.

Dr R J N Phillips to DESY, from 24 - 27 September, to participate in Conference.

Mr D Jones to DESY, from 26 - 29 September, to attend the ECA Annual General Assembly and the associated Conference.

Farewell to Rosie

Many friends and colleagues gathered in R18 Electronics Workshop, to wish Rose Wakeling well on the occasion of her retirement. 'Rosie', as she is known to all, has worked in the Lab. for thirteen years, and is now off to keep an eye on husband Ralph, who retired from NIMROD some eighteen month ago.

In making the Presentation, Peter Wilde thanked her for all her efforts, and commented that Rose had started work in Electronics with STC in 1934 - before many of those present were born. To mark the occasion, gifts, including a Gold Cross and a mounted Tunnel Card, were presented.(Rose was of the first four ladies recruited to help produce the Tunnel Electronic Readout System, way back in 1965).

In reply Rose thanked everyone for their Good Wishes and said she had enjoyed working at the Lab. with so many nice people, and promised to visit us all from time to time.

Omega Minus Beams ?

The first outstanding success of the *quark model* in particle physics theory was that it predicted the existence of a hitherto unknown particle - the *omega minus* (Ω^-). After a frantic search at laboratories around the world, the particle was discovered in 1964 in bubble chamber film from the Brookhaven National Laboratory. This exciting find confirmed the SU(3) classification for hadrons which is based on the (still-elusive) quark particles.

Since 1964 only 160 omega minus events have been published from bubble chamber film; the experimental results have been rather sparse and gave conflicting values for the lifetime. However, rapid progress in recent years has produced beams of *hyperons*, which contain several types of rare particles including the omega minus. A large effort has been put into building this kind of beam at Fermilab (Chicago) and at CERN.

A collaboration of physicists from Bristol, Geneva, Heidelberg, Orsay, Rutherford and Strasbourg have laboured over the past 3 or 4 years to produce a high-quality high energy hyperon beam at the CERN SPS. In this beam, 3×10^{10} protons at 210 GeV/c incident onto their target yields about 4000 sigma particles, 400 ksi particles and 0.1 omega minus at 100 GeV/c.

At the Nimrod Lecture Series talk on 4 September, Dr Bob Brown (Rutherford Lab) spoke of the recent success of the CERN hyperon beam. The data from 20 days of running have produced over 2500 omega minus events of which about 1700 have so far been analysed - about ten times more than the world has published up to now!

The omega minus decays weakly in a number of different ways; the most common produces a lambda particle and a negative kaon, and another important decay mode produces a ksi particle and a pion.

From a study of the decays into lambda/kaon the experiment has produced an accurate value for the lifetime of the omega minus which is

$$(0.82 + 0.06) \times 10^{-10} \text{ seconds.}$$

Preliminary results on the ksi/pion decay modes are in agreement with predictions made using the most recent theories of strong and weak interactions. Three candidate-events have been found which correspond to the rare semileptonic decay producing a ksi, an electron and a neutrino.

The experiment measures all the particles produced in the lambda/kaon decay mode of the omega minus. By using information from the lambda decays one can determine the asymmetry of the decay of an omega about its spin polarisation axis without having to worry directly about the polarisation of the omega. This asymmetry parameter measures the level of parity violation in the decay.

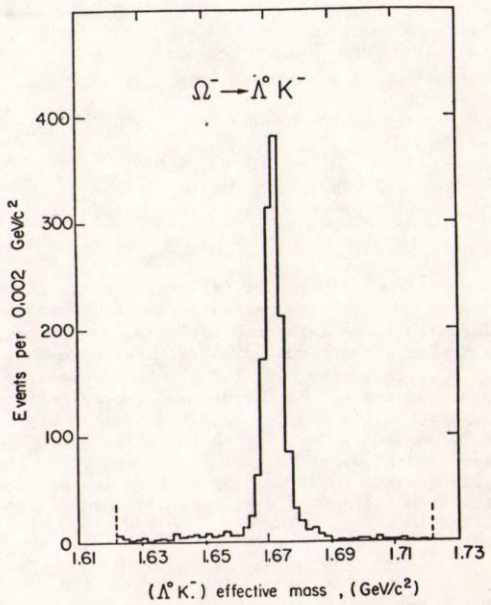


Figure: An effective mass plot for the omega minus decays producing a lambda particle and a negative kaon.

Previous attempts to measure the asymmetry have produced inconclusive results, however this new experiment yields a precise value which is quite small and in agreement with theoretical predictions.

Dr Brown's talk gave evidence of the rapid development which is occurring in particle physics research, in that since the discovery of the first omega minus just fourteen years ago it is now possible to perform experiments using *beams* of these rare particles.

The Editor thanks Dr Bob Brown and the CERN Courier for the information contained in this report.

LIBRARY NOTICE.

"Schottky and Low-power Schottky data book including digital signal processing handbook. Advanced micro-devices". 2 edition Published by Advanced Micro Devices Inc. 1977.

A copy of this book has arrived in the Library via the Stores. Will whoever ordered it, please contact the Library Desk R.61. ext. 384.

A Smashing Success

The first Table Tennis Club on site was formed in the early 1960s at Atlas, and initially functioned in the 'Common Room', removing to the Lecture Theatre as the activity grew.

At this time, at least one, and as many as four teams entered the Didcot and District Table Tennis League. Due to building alterations at Atlas in 1970, an alternative venue had to be found, and the Club was offered building R15, opposite the Cooling Towers, where its headquarters are today.

In 1976 "Rutherford Lunch-time Players" were amalgamated into the Club, renamed 'Rutherford Table Tennis Club'. Two teams were entered into the Didcot League that year, with Rutherford 'A' in Division I, and Rutherford 'B' in Division IV. The 'A' team found their division very strong and were relegated to Division II the next season, where they were runners up, while the 'B' team were promoted to Division III.

Individual players have scored good wins, including the *Individual Division Championship Trophy* and the *Chartapak Pairs Tournament* held during the Didcot Festival of Sport Week. A team of three won the *SRC Indoor Sports Day Trophy* and the 'B' team gained the *AERE Lunch-time Handicap Trophy*.

Last season was, therefore, a highly successful one for the Club, and, with four teams entered in the Didcot League for this season, they hope for even greater glory.

Club Members, John Varley, Peter Horton, Brian Wyborn, Harry Jarvis and Peter Kent, with some of the Club's Trophies won last season.

Rutherford Table Tennis Club welcomes all standards of players. For further information, contact J Varley on ext. 6363 or 6681.

RUTHERFORD ANGLING CHAMPIONSHIP

To be fished at Clifton Hampden on Saturday 30 September from 8000 - 1300 hrs.
Entrants to contact Peter Craske Ext. 232 by 25 September.

ANNUAL RUTHERFORD CHESS TOURNAMENT

The Tournament will start on Monday 9 October.
Anyone interested, please contact Peter Craske on ext. 232.

CHRISTIAN FELLOWSHIP

The Fellowship meetings on Friday September 15 and 22 will take the form of informal discussions on the functions, results and future plans of the Fellowship. Time will be given to the election of a new Committee. Those connected with the Fellowship are warmly invited to attend, and nominations for Committee membership should be forwarded to Frank Smith in building R20 by Thursday 14 September.
On Friday 29 September the meeting will be led by Mrs Newbold of building R16. All are welcome.

The Fellowship meetings are held in the R2 Conference Room (top floor) at 12.30 pm.

AERE HORTICULTURAL SOCIETY

- holds its Annual Flower Show on 21 and 22 September in the Social Club. There are classes in Needlecraft, Floral Art, Handicrafts, Cookery, Preserves etc as well as the Flower and Vegetable Classes.
Schedules may be obtained from Wendy Dance AERE Ext.2312 or Philip Crane Rutherford 337.

RUTHERFORD WIVES COFFEE MORNINGS

Once a month a coffee morning is arranged at the Cosener's House in Abingdon for all Rutherford Wives to gather together and meet some old friends and new faces. Young children can enjoy TV, orange-juice and biscuits! The coffee mornings are from 10.30 until noon and have been arranged for:

Wednesday	13 September
Thursday	12 October
Tuesday	14 November
Wednesday	6 December

Make it a date! For futher information call Suzanne Litchfield (Abingdon 21310), Gillian Litt (Abingdon 26009) or Julie McGeogh (Oxford 722781)

LUNCH-TIME FILMS AND MUSIC

These cultural activities will be presented in the Lecture Theatre on Wednesdays at 12.30. The Music Programme will alternate with Film Shows:

Wed. 13 Sept	Beethoven's EROICA
Wed. 20 Sept	ORAPA - a film on the search for diamonds in South Africa
Wed. 27 Sept	Music by the Pink Floyd Group - songs from the film MORE

A HEARTY WELCOME TO JEAN

This edition heralds the arrival of a new Editor for the Rutherford Bulletin. Mrs Jean Banford joined the Lab. on 4 September and is installed in the Bulletin Office in building R20 as a full-time member of the Scientific Administration Group. We warmly welcome Jean, wish her every luck in this new challenge and await the emergence of her own personal style in the years to come.

(The Readers)

RUTHERFORD LABORATORY BULLETIN *Published by the Scientific Administration Group*

Editor: Jean Banford

Deadline for Insertions: 1000 hours Tuesday 19 September

XXXXXXXXXXX
Room 42 Building R20
Rutherford Laboratory
Chilton Didcot Oxon OX11 0QX
Abingdon (0235) 21900 Ext 484