

12 - 19 December 1977

A Close Shave

We reported in Bulletin No 18 on the experimental apparatus being built at the Rutherford Laboratory, part of the UK's contribution to the European Muon Collaboration project at CERN. This project has already produced a number of awards under the Suggestions Awards Scheme with further suggestions in the pipeline. The most recent of these to surface produced an award of £600, the highest yet made since the introduction of the SRC Scheme in 1971.

Problem and Solution

Part of the Rutherford Laboratory's commitment is the provision of 12 large drift chambers of 2 different sizes, 3.6 m x 3 m and 3.6 m x 4.5 m (approximately 12' x 10' and 12' x 15') using a total of 50 glass fibre honeycomb panels. Each panel has bonded to it, printed circuits and it is to the preparation of these that the suggestion applies.

The printed circuit sheets are manufactured by contractors in 3 stages; the base material, a flexible resin bonded glass fibre laminate, 0.558 m (22") wide, produced in rolls; the bonding of copper, 1.4 thou" thick to one face, and after cutting to the required lengths, the final etching process which leaves copper conductors 3 mm wide at 3 mm pitch (there are 90 in a 22" width). The flexible printed circuits sheets, 95% being between 4 and 5 metres long (the others being 1 m) are as far as known, the largest ever made in the world.

Before the strips, known as wallpaper, are resin bonded under vacuum on to the boards, the long raw edges have to be trimmed back leaving the two edges parallel to better than 0.5 mm. Initially hand trimming was used, however the two skilled craftsmen concerned, Dave Price and Terry Wickens, decided that with hundreds of sheets to trim, speed and accuracy were essential. Their suggestion uses a small circular saw in a compressed air drill running on guide rails set in a very large steel table. The lower photograph shows the device being demonstrated to the Director by Dave Price, the table, printed circuit sheet and edge trimmer being clearly shown.

There are 610 sheets of 'wall paper' plus non-etched sheets bonded to the reverse side of the outer boards in each chamber to provide screening and equalize the stresses. Obviously with such an operation, there are bound to be rejects, an example being the very slight twist which only shows up when a sheet is held dead flat under vacuum. This and other inaccuracies entails many additional trims, however the method is so accurate that a request to remove another 0.254 mm (10 thou") can be met.

The estimated number of trims is equal to 960 large printed circuit sheets and this adds up to a cut of about 10 kilometers (or 6¼ miles)!

In this, probably the first main production operation undertaken by the Laboratory, the advantage is more than financial as it would have been difficult to meet both tolerances and time scales using a hand method more suited to a 'one-off' job.

The Presentation

On Friday, 2 December, the Director, Dr G H Stafford visited the R2 Mechanical Workshop Mess Room to present the £600 cheque to Dave and Terry. He spoke of the value of the Suggestions Awards Scheme to the Council and the Laboratory remarking that it was a pleasure to make the award and hoped to present many more.

The Laboratory had seen hard times but now things were looking up and with the wide range of activities now under way, there was work until the end of the century.



Dr Stafford felt that the Laboratory was very much in the world league and in competition with work going on in Germany, France and the USA; in particular, the Muon work provided the Laboratory with a shop window. He concluded, "I am delighted to shake your hand Dave and you Terry". The party then moved into the workshop where the Director was shown the trimming machine in operation.

Terry Wickens joined the Rutherford Laboratory in 1970 after working for two small local engineering firms. David Price arrived in 1962 and has worked on Nimrod since 1963. He has been AUEW Shop Steward for many years, Convenor of Rutherford Laboratory Shop Stewards since 1972 and TU nominee to the Rutherford Laboratory Suggestions Awards Committee since the foundation of the Science Research Council Scheme in 1971.

The final word is with Dave as having thanked the Director for the cheque (or rather his share) he mentioned that he now had the answer to this wife's remarks, 'when are you going to get an award'? A very effective answer Dave!

INTERNAL EVENTS

NIMROD LECTURE SERIES

Monday 12 December
1130
Lecture Theatre

A New Tool for the Study of Fundamental Reactions: Parity Odd Correlations in Quark Fragmentation.

Professor O Nachtmann/Heidelberg

HEP SEMINAR

Wednesday 14 December
1100
R61 Conference Room

Natural Left-Right Symmetric Theory of Weak Electromagnetic Interactions

S Rajpoot/Imperial College

SAFETY FILM SHOW

Wednesday 14 December
1200 and 1315
Lecture Theatre

'INTENSIVE CARE', a 20 minute colour film.

In an operating theatre lies a seriously injured man; as the theatre staff fight for his life we see the events leading to the accident. The film emphasises that we all have a responsibility for safety.

NIMROD LECTURE SERIES

Monday 19 December
1130
Lecture Theatre

An Experimental Review of the Status of Baryonium

A Astbury/RL

OVERSEAS VISITS

Dr R P Hand, to CERN, 11-16 Dec;
on-line software for the WA3

experiment.

Mr A R Mortimer, Mr L Phillips, Mr K A Freeston and Mr B R Diplock, to DESY, Hamburg, 12-13 Dec, for discussions on workshop facilities for JADE and TASSO and to attend TASSO collaboration meeting.

Dr R W Newport and Mr W J Tallis, to CERN, 12-15 Dec, to attend European Hybrid Spectrometer meeting.

Dr M J Hotchkiss, to CERN, 12-22 Dec, to work on WA3 experiment.

The Director, to CERN, 13-15 Dec, to attend CERN Committee of Council and CERN Council meetings.

Dr L C W Hobbs and Dr G C Stirling, to Julich, 13-15 Dec, to attend meeting on New Neutron Research Facilities in Western Europe.

Dr C J Carlile, to CNRS Grenoble, 14-16 Dec, to attend acceptance tests of equipment.

"ETTORE MAJORANA" ACTIVITIES IN 1978

The following information has been received from the "Ettore Majorana" Centre for Scientific

Culture, Erice, Italy.

Trends in Computational Complexity: 2-10 January 1978. The closing date for applications is 30 November 1977.

Direct Methods of Solving Crystal Structures: 27 March-9 April 1978. The closing date for applications is 30 November 1977.

Structure and Function of Chromatin: 12-26 April 1978. The closing date for applications is 6 January 1978.

Advances in Pathophysiology and Clinic of Old Age: 3-8 March 1978. The closing date for applications is 15 January 1978.

Full details of courses, and application details such as fees, addresses etc available from the Editor.

PERIODIC SAFETY TEST OF PORTABLE ELECTRICAL EQUIPMENT

The test carried out during October/November has now been completed.

The current marker colour

is YELLOW and is marked "Do not use after March 1978".

Portable electrical equipment marked otherwise, or has no marker should be considered unsafe and must not be used.

All such items should be returned if possible to Electrical Services Section, Building R18. Alternatively ring A Hipwell, on Ext 573.

WRITERS GET LAZY R AND LAZY R

The Laboratory headed notepaper is being changed to include the new logo -

rapidly becoming known as the Lazy R.

The new symbol needs to be well publicised; in future, letters will ensure outsiders get the message. In addition, it is being incorporated in the postal franking stamp where it should make a very good impression.

PS With luck, this month's salary envelopes will be printed with the logo. The principle being that "It pays to advertise", or should it be, "Pays advertise it too"? (Ugh - Ed)

BATTERY OPERATED CALCULATORS

Calculators have been damaged due to the batteries leaking - even if they are of the 'Mallory' type.

It is important to check batteries frequently, particularly if the calculator is not in regular use.

FILM BADGE NOTICE

Period 13 will be extended to cover the Christmas and New Year breaks. The films for Period 1, 1978 will be put ready for collection on Friday, 30 December.

Colour Strip - BLUE for $\beta\gamma$ films and neutron packs.

CHRISTMAS MENU

Tuesday 20 December 1977



Roast Turkey & Stuffing

Bacon Roll

Chipolata Sausage

Cranberry Sauce



Roast & Creamed Potatoes

Brussels Sprouts

Glazed Carrots



Christmas Pudding & Brandy Sauce

or

Sherry Trifle



TICKETS: Now on sale at £1.00 inclusive of VAT from Shop - R22
Coffee Lounge - R1

BOOKINGS: Should you require a table reserved for parties of six or more,
contact Restaurant Manager, Ext 6229

SHERRY: Have a pre-lunch aperitif - on sale from the Sherry Bar, R22
Coffee Lounge

WINES: A variety of Wines on sale by the glass or bottle from the
Restaurant Bar in the Rotunda

To keep the price of this Christmas menu at a reasonable level the 'starter' course has been omitted.

The tickets are in two portions (like the menu), which enables you to obtain your 'sweet' fresh and hot; this of course applies to the Christmas Pud and not the trifle - or the girl friend.

CHRISTMAS MAIL ARRANGEMENTS The LAST DELIVERY of Rutherford mail to the Post Office will leave the Main Post Room at 1100 hours on

Friday 23 December.

MAIL REACHING THE POST ROOM AFTER THIS DATE WILL NOT BE TAKEN TO THE POST OFFICE UNTIL WEDNESDAY 28 DECEMBER 1977.

THANKS EXPRESSED Lesley Wilkins would like to thank all her friends for their good wishes and generous parting gift which will always be treasured. Thanks again.

BULLETIN NOTICE The present issue of the Bulletin covers a period of one week. The next and final issue for 1977, No 24 will be published during the week commencing 19 December. It will cover the period, 19 December 1977 - 16 January 1978. Items for inclusion in this issue should be sent to the Editor as soon as possible.

CHRISTIAN FELLOWSHIP CAROL SERVICE The Annual Carol Service will be held in the Lecture Theatre at 1240 on Friday, 16 December. This year the Service will be led by the Rev Norman Russell, Vicar of Harwell. The carols will be accompanied by an electronic organ and a solo will be sung by Jimmy Darius. All are very welcome to come along and join in.

Successful Experiment at ANL Using Superconducting Dipole

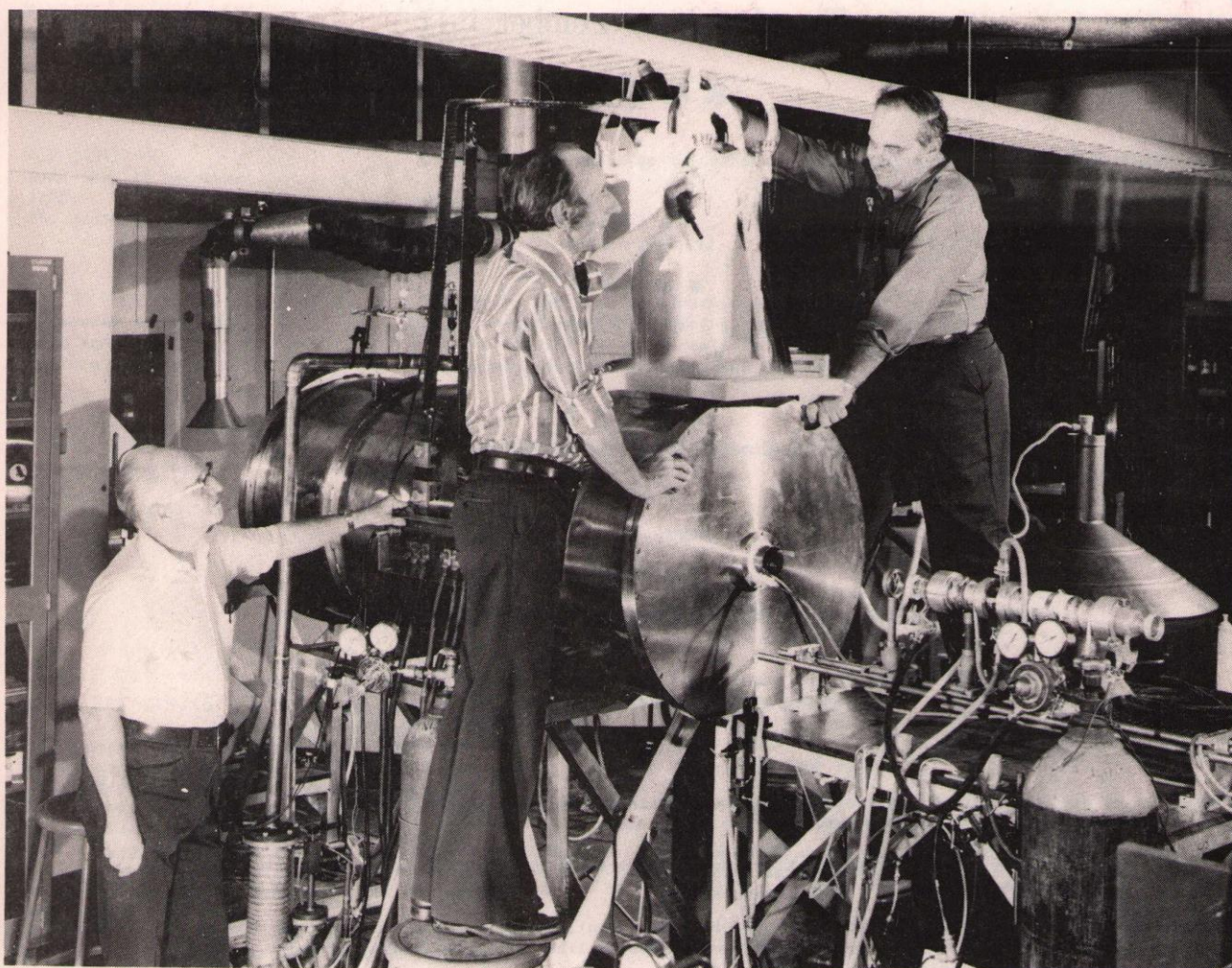


Photo: Professor Garton, Imperial College (centre) with F Tomkins (l) and B Eredi, Argonne, preparing for a run

News has recently come through that the Rutherford Mark I DC dipole has performed well in a series of optical spectroscopy experiments at the Argonne National Laboratory.

The Mark I dipole, constructed in Technology Division during 1975-76, produces transverse fields of up to 5T in a room temperature bore of 95 mm diameter and 1.1 metres length; the cryostat was made by the Oxford Instrument Company.

These experiments were a collaboration between Professor Garton of Imperial College and colleagues from the University of Wisconsin and the Argonne Laboratory.

The magnet has been used in a careful determination of the effect of magnetic fields on lines in the ultra-violet spectrum of atomic barium. This has involved the operation of a resistively heated oven containing barium

vapour at 760°C within the bore of the superconducting magnet.

In the particular spectral series studied ($6s\ 6p^1 - 6s\ ns^1$) the lines show shifts in a magnetic field due to the diamagnetic Zeeman effect. The shifts are proportional to the square of the field rather than linear with field as in the normal Zeeman effect. Hence the high field (4T) available from the dipole was essential to observe a reasonable splitting.

The variation in the shift for different lines gives information on the energy levels of the barium atom and can be used as a test of the detailed form of the atomic wavefunctions.

An understanding of the fine details of atomic spectra is useful in astrophysics since the spectral lines in the light from a star can be identified and in some cases used to measure the magnetic field in the star.

RUTHERFORD LABORATORY BULLETIN

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