

JADE is In

British high energy physicists are collaborating in two major experiments at the new electron-positron colliding beam machine PETRA at the DESY Laboratory in Hamburg. In the November 1978 issue of the *Bulletin* we announced the success of the TASSO Collaboration which had detected its first beam. This issue highlights the second experiment JADE which is now installed and ready to begin its physics programme.

JADE is short for the Japan, Deutsch and English team who have built a compact magnetic detector specially designed for the identification of leptons (i.e. electrons and muons). The apparatus consists of a solenoid magnet, 3.5m long and 2m diameter, a cylindrical array of drift chambers, a 3000 element lead-glass array and a sophisticated multi-layer muon filter. The UK teams involve physicists from Lancaster and Manchester Universities and the Rutherford Laboratory.

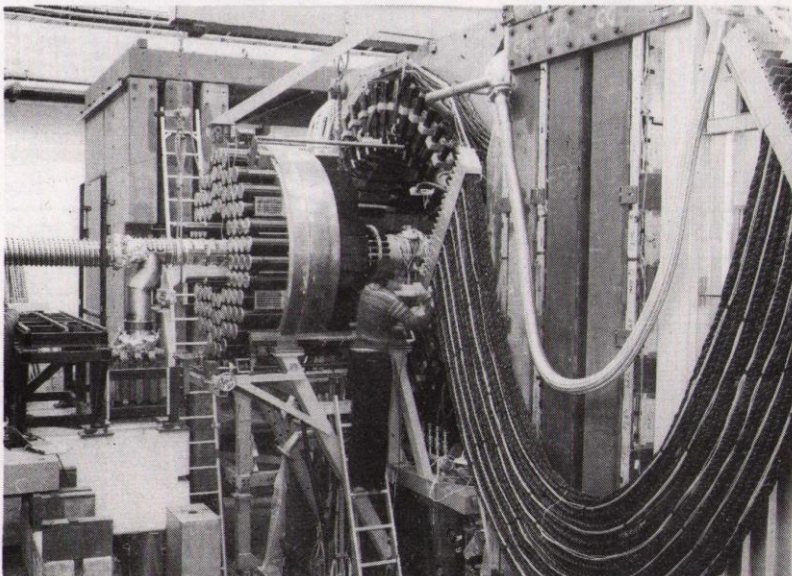
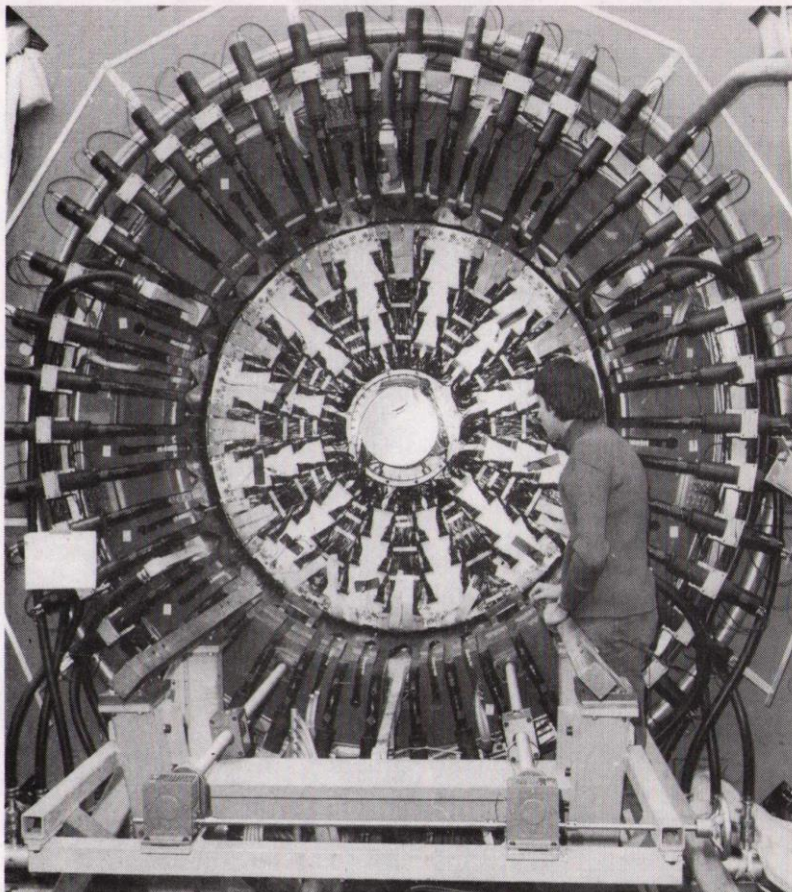
We are pleased to bring you the latest news of the JADE experiment, sent in from Hamburg by Dr Robin Marshall:

The assembly of the JADE detector was completed last week and the apparatus moved into the North West interaction region of PETRA. JADE is the first of the new experiments proposed for PETRA to move into the beam with the whole of the detector in position. It is also the heaviest (1300 tonnes of all the experiments at DESY as the Rutherford Laboratory Physics Apparatus Group and Stores (Receipts and Despatches) know only too well! Moreover, it is doubtful if any of the Laboratory's craftsmen will ever forget their first installation at DESY in Hamburg; it began amidst floods last summer and ended to the accompaniment of 2 months of snow and blizzards.

We wish the JADE physicists good luck in their first runs in March and look forward to hearing of new scientific discoveries in the months to come.

Above: An end view into the magnet shows the cylindrical inner drift chamber detector and the array of counters.
(Photo DESY)

Below: A general view of the detector shows the magnet iron end cap fitted with lead glass counters about to slide in. The three layer muon filter can be seen in the foreground and background.
(Photo DESY)



EXTERNAL Events

N.P.D. COLLOQUIUM

H.8. AERE HARWELL - 1530 hrs

1 March: A A Farmer/CTS Risley
'Assessment of Fuel
Cycles'

8 March: Prof M Thompson/Sussex.
'Developments in Sputtering
Theory'

ELEM.PART.PHYS.

QUEENS BLDG.WESTFIELD

COLLEGE - 1400 hrs

28 Feb: Dr R Heimann/Oxford
'Scaling Violations in
QCD'.

7 March: Prof A Donnachie/Manchester
'Elastic Photoproduction
of Quark Jets'.

PHYS.DEPT. COLLOQUIA

J J THOMSON LAB. READING - 1700 hrs

5 March: Dr J L Finney/Birkbeck
'Modelling the Crystal-
Melt Interface'

12 March: Prof C W McCombie/Reading
Einstein's Early Interests
(A talk to mark the
Centenary of Einstein's
birth - 14 March 1879).

THEO.PHYS.SEMINARS

Q.M.C. - 1615 hrs

5 March: Dr D B Fairlie/Durham
'Higgs' Fields and the
Determination of the
Weinberg Angle'

HEP SEMINARS

MANCHESTER - 1415 hrs

6 March: P Renton/Oxford
'Tests of QCD from a
Study of Neutrino
interactions in BEBC'

NUCLEAR PHYS.SEMINARS

L.TH. N.P.D. OXFORD - 1430 hrs

5 March: Dr A Edwards/Oxford
'Nuclear Astrophysics'

THEO.PHYS.SEMINARS

CONF.RM.BLDG 8.9 AERE - 1430 hrs

27 Feb: Dr P T Greenland/TPD
'Highly Stripped Ions
of Hydrogen Atoms.
The Quasimolecular
Picture'

6 March: Dr J H Harding/TPD
'Crystal Field Theory'

ELEM.PART.PHYS.SEMINAR

NUCLEAR PHYS BLDG OXFORD - 1430 hrs

1 March: Dr H Muirhead/Liverpool
'Antiproton Annihilation
Processes'

THEO.PHYS.SEMINARS

CLARENDON LAB.OXFORD - 1615 hrs

1 March: Prof C A McCombie/Reading
'The Early Work of Albert
Einstein'

8 March: Prof L Castillejo/UCL
'The Classification of
Yang-Mills fields'

THEO. & HEP SEMINARS

L.TH.C SOUTHAMPTON - 1430 hrs

2 March: Prof L Castillejo/UCL
'Classification of
Yang-Mills Fields at a
Point'

9 March: Dr B Duff/UCL
'Large Angle Elastic
Scattering and Constituent
Models'

SCHUSTER COLLOQUIA

MANCHESTER - 1615 hrs

7 March: Dr R Chapman/Manchester
'The Radial Distribution of
Valence Nucleons'

THEO. PHYS. SEMINARS

SCHUSTER LAB. - MANCHESTER - 1430 hrs

28 Feb: Dr G P McCauley/Birmingham
'Disclinations in non-Abelian
Gauge Theory - Confinement
by Entanglement?'

7 March: Dr C J Isham/I.C.
'Quantised Spinor Fields
in Curved Space-Time'

THEO.GP. SEMINARS

DARESBURY - 1400 hrs

5 March: Prof J Beeby/Lecicester
'The structure of
Metallic Glasses'

12 March: Dr C V Sukumar/D.L.
'Schrodinger Type Equation
in Momentum Space'

HEP SEMINARS

CAVENDISH LAB - CAMBRIDGE - 1500 hrs

7 March: Dr C M Fisher/RL
'The Experimental Status of
Hadronic Charm Productions'

14 March: Dr K Green/RL
'Particle Physics with Cold
Neutrons'

PART.PHYS. DISCUSSIONS

W.SEMINAR RM - BIRMINGHAM - 1615 hrs

2 March: Dr J Mulvey/Oxford
'Tests of QCD in High Energy
Neutrino Expts'

9 March: Dr W Louis/RL
'Anti-neutrino Current
Interactions at NAL'

HEP SEMINARS

DAMTP - CAMBRIDGE - 1500 hrs

2 March: R L Jaffe/Oxford
'Quark-model Eigenstates
and Low-energy Scattering'

Training

THE INSTITUTION OF MECHANICAL ENGINEERS

12 March: 'The Lessons of
Engineering Disasters
and Successes'.
(Half day Seminar)

BRUNEL INDUSTRIAL SERVICES BUREAU

23-25 April: 'The Welding and Failure
of Structural Steels'.

21-25 May: 'Plastics Technology
Course'.

UNIVERSITY OF SALFORD

10 April: 'An Introduction to the
Design of Hydrodynamic
Journal Bearings'.

11-12 April: 'An Introduction to the
Use of Fracture Toughness
Measurements'.

23-27 April: 'Principles and Industrial
Applications of Electron
Microscopy and
Microanalysis'.

NATIONAL CENTRE OF TRIBOLOGY

22 March: 'Dry Bearings'

BRUNEL UNIVERSITY

24-26 April: 'Acoustic Impedance
Measurement Course'.

25-29 June: 'Plastics Materials
Properties and Applications'.

Further details of courses can be
obtained from TRAINING SECTION
Ext. 6285/266

OVERSEAS Visits

D R Moore, F S Whear and M D Percival
to CERN. 26-28 Feb. for technical
discussions.

C J S Damerell to CERN 26 Feb - 8 March
to work on Experiment NALL.

N J Diserens to CERN 27 Feb - 5 March
to program computer.

R C Carter and G R Thomas to CERN
28 Feb - 2 March for Inspection of
Maquette mods.

P J Litchfield to CERN 4-7 March to
work on Proposal 197.

G H Rees to USA 26 Feb - 15 March to
attend National Accelerator
Conference and various visits.

J B Forsythe to ILL Grenoble
28 Feb - 27 March to carry out
experiments.

I S K Gardner, M R Harold, J T Hyman
and R H C Morgan to USA 5-23 March
to attend National Accelerator
Conference, and various visits and
discussions.

C W Planner to USA 5-27 March to
attend National Accelerator Conference
and visits to Labs.

J R Bennett to USA 10-23 March to
attend National Accelerator Conference
and ICANS III Meeting.

A Carne to USA 10-29 March to attend
National Accelerator Conference and
ICANS III meeting.

J D Lawson to USA 10-24 March to attend
National Accelerator Conference and
ICANS III meeting.

A D Taylor to USA 14 March - 4 April
to attend ICANS III meeting and LASL.
R W Wimblett to USA and Canada for
discussions at TRIUMF and to attend
ICANS III meeting.

C J Carlile to Munster 5-10 March to
attend meeting on Hydrogen in Metals.
B T Payne and J A Blissett to DESY
4-9 March for TASSO installation.

HPD ● Make a Million

By coincidence, the HPD devices at Birmingham University and at the Rutherford Laboratory have both clocked up their one millionth bubble chamber event this month. The name HPD stands for Hough Powell Device, after the inventors. We thank Drs Ian Bloodworth and Ken Paler for the following news item:

At Birmingham

The HPD at Birmingham University began operation in 1969. Since then it has been extensively modernised with new circuitry and an argon laser to provide a stable source of light used to scan across the field. The complex information provided is sent to an IBM 370/145 computer where filtering, a preliminary geometry analysis and any necessary patchup are performed. For final analysis the events are sent to the Rutherford Laboratory IBM 360/195 computer where the physicists' processing chain starts, culminating in a data summary tape.

The Birmingham HPD has been used to measure film from the CERN 2m hydrogen bubble chamber:

Expt T148	16 GeV/c K^+p
T179	4 GeV/c π^+d
T211	1-2 GeV/c K^-d
T209	8.2 GeV/c K^-p
T233	1-2 GeV/c K^+p

Many people have contributed to the construction and successful exploitation of the HPD, notably Dr J Simmons (now with IBM) and Mr W N Stokes on the software side, Dr D Zivkovic (now Belgrade University), Dr G Zivkovic (now Honeywell computers) and Mr H R Shaylor on hardware, and Dr F MacDonald and Mr W R Reading on operations.

and at Chilton

The Rutherford Laboratory HPD 2 also measured its one millionth event. This total runs from 1973, when HPD1 was switched off (after having measured 1,250,000 bubble chamber events from 1968).

The HPD2 system consists of a precision film scanning and track digitising machine which is controlled by a DDP 516 computer on line to the IBM 360/195 central computer. The film is scanned with a 6 μ m light spot generated from an argon laser operating at a wavelength of 488nm. The position of the track signal is digitised with high precision ruled reference gratings which give a least count of 2 μ m. The optimum measuring speed is 100 events per hour. This compares with about 10 events per hour on a manual measuring machine. (The precise rates depend on the type of film and event being measured). This increased measuring rate made feasible high statistics bubble chamber experiments. The HPD forms a vital link in the data reduction chain which begins with the taking of film at the chamber and ends with the new physics results which add another piece of the jigsaw of man's understanding of the physical world.

The type of film now being measured has changed since HPD2 began operation. At the beginning it was mainly film from the CERN 2 m chamber whereas now there is film from the Big European Bubble Chamber (BEBC) (3.8 m in diameter, at the CERN SPS), the 1.5 m British Chamber with a track sensitive target inside (the last chamber to run at Nimrod) and the 40 inch hybrid rapid cycling chamber at SLAC in California.

Many people have contributed to this achievement; the scanners who roughly digitise the film to guide the

HPD, the hardware and software personnel who keep the machine running, the operators who daily and nightly keep the machine measuring; and all the data processing personnel who look after the book-keeping involved.

Many congratulations to everyone involved. (Thanks a million!)



Part of the millionth bubble chamber picture measured with Birmingham University's automatic scanning machine. The event is a "601" (six charged prongs and a neutral strange particle decay) from film of a -8.25 GeV/c kaon beam into the CERN 2m hydrogen bubble chamber.

The Blood Transfusion Service

There are 14 Regional Health Authorities in England each responsible for meeting the transfusion requirements of its own hospitals, and having its own Regional Centre. Three Central Laboratories are also maintained - the Blood Group Reference Laboratory, and the Blood Products Laboratory at Elstree with which is associated the Plasma Fractionation Laboratory, Oxford.

Central Laboratories

The Blood Products Laboratory at Elstree prepares blood products, undertakes research into the production and uses of plasma fractions and substitutes, and operates a freeze-drying plant. The Plasma Fractionation Laboratory at Oxford which comes under its control, prepares special products needed for the treatment of haemophilia and related diseases.

The Blood Group Reference Laboratory distributes all types of blood grouping sera; it maintains stocks of rare sera and accepts blood samples from Regional Centres for the identification of unusual blood group factors. It also maintains the National Panel of Donors of Rare Blood Types, a record of donors with very rare blood group patterns.

Regional Centres

The functions of these Centres are many and varied. They are responsible for the organisation, collection, and distribution of whole blood and plasma, for maintaining Blood Banks, for teaching and for research.

Facilities for blood grouping, testing, cross-matching, for providing whole blood for open heart surgery, and diseases such as haemophilia, as well as tissue-typing for organ transplantation, are also maintained. The three Central Laboratories are supplied with their needs from the Regional Centres. A typical Regional Transfusion Centre supplies 2000 donations weekly to some 50 hospitals, serving a population of approximately 2,000,000 although some centres, especially those in London have larger responsibilities.

The Oxford Region extends from the City in a 60 miles radius, from Corby in the North to Newbury in the South, and from Cirencester to Windsor, East-West. There are a large number of Hospitals within the region including Stoke Mandaville at Aylesbury and John Radcliffe Oxford, and at times the London Area is also supplied with blood products from this region.

Sessions held in the Oxford Region are very important because of Platelet collection, vital in open heart surgery. Fresh blood is taken from the morning session to Oxford, where it is centrifuged to separate Plasma from Red Cells. A further process will separate Platelets from Plasma, and these are used in open heart surgery every week. The Platelet is a vital component in 'sticking' wounds and healing damaged tissue.

Give Generously!

From this article it will be apparent that much of the organisational effort is wasted if sessions are not well attended. A team will be visiting the Rutherford Laboratory on March 5th and 6th. Sessions will be held in R15 from 10.00-12.00 hrs and from 13.30-15.00 hrs.

This is the Moody Blues

The 'Moodies' came together in the early sixties in Birmingham. It was the 'Beatles' era and record companies weren't interested in any group unless it had the 'Mersey Sound' - understandably the 'Moodies' conformed. They had a number one hit 'GO NOW', which was indistinguishable from a dozen Beatles hits.

Concept

However, this brought them recognition and later they were able to persuade Decca to let them loose in a recording studio to produce a 'concept album'. What emerged was 'Days of Future Past' with the London Festival Orchestra to add a bit of backing. One of the tracks was 'Nights in White Satin' which, issued as a single, made number one on two separate occasions and is arguably the most successful pop record of all time (if you forget 'White Christmas').

Distinctive Sound

After the 'Days' album they dispensed with the orchestra and introduced a variety of instruments. Amongst them was the MELLOTRON, which was to give them their distinctive sound. This is virtually a symphony orchestra

played from an organ keyboard. It is an incredibly difficult instrument to play and Mike Pinder of the 'Moodies' is probably the only person ever to master it - and then only because he was once test engineer for the company. They concentrated on 'concept' albums such as 'In Search of the Lost Cord' 'Threshold of a Dream' 'A Question of Balance' etc, and issued few singles. By the late sixties they were producing albums on their own 'Threshold' label, and the range of instruments used more or less limited them to the studio. They have made few public appearances. A sell-out concert at the Albert Hall and an open-air 'gig' in Germany with an audience of two million, are probably the only time they have been seen in Europe since the late sixties. Their albums, however, have each sold well over 3 million copies and are still selling. You can walk into record shops now and buy an album that was produced ten years ago, and their latest 'Octave' was made only last year.

Own Material

The 'Moody Blues' are five highly polished musicians who have been

together since the mid-sixties. Mike Pinder keyboard, Graeme Edge drums, John Lodge, Justin Hayward mainly guitars and 'cellos and Ray Thomas who plays just about everything. They all sing! Hayward is from Swindon, the rest from Birmingham. The Group write all their own material, produce their own records and of course play all the instruments.

The 'Moody Blues' sound is all their own. It has been said that you can tell it on a car radio going the opposite way down the M1, but it really needs hi-fi stereo to do it justice. 'This is the Moody Blues' was produced in 1974 and is an amalgam of typical tracks from their albums to that date.

Unbiased

If you don't know the 'Moodies' come along with an unbiased ear (preferably two) even if just out of curiosity or to criticise - you may have a surprise. If you are familiar with their music you'll want to come anyway. Finally, for devotees of other kinds of music, Justin Hayward describes their sound as a rock base, a folk middle and a classical top.

Recreational Society

As those of you who are actively engaged in activities in R15 already know, the next phase of the Laboratory building programme will need to use the space currently occupied by the Recreation hut. Thus in the first week of March, R15 will be closed and dismantled and the equipment stored. However, the interruption of facilities will only be temporary. R15 will rise again (Pheonix-like?) on a new site nearer the sports field. As well as catering for existing clubs, there will be changing facilities, and showers will be added later. These will be much appreciated by all the footballers, cricketers, joggers etc, as well as the other users of the hut. I would like to thank those responsible for making the additions possible, and feel sure that they will assist in the strengthening and expanding the Society.

Chairman, Rec. Soc.

Film Badge Notice

Period 3 commences Monday 26 February. Colour strip GREEN for beta-gamma films. Please change your film promptly and return old one.

Christian Fellowship

March 8:

Do you remember Sunday School? The idea of listening to someone explain the meaning of the Bible may seem a little old fashioned today but why not come along to a lunch time Bible Study Group. The subject will be 'Living Today' and will take the form of informal discussion where all will be able to join in and contribute. The first of these study sessions will be led by Dennis Williams at 12.30pm in the R2 Conference Room.

March 15:

Johnny Cash, the country and western singing star will soon be appearing live in this country. Why not come along to the Lecture Theatre at 12.30 pm on Thursday March 15th to hear him on record relating in words and song the story of Jesus.

Missing

Lost from building R1, Texas TI Programmer Calculator, no. X004509. Will anyone who knows the whereabouts of this item please contact P Haskell R2, Ext 6127.

Folk Club

The next meeting of the Club will be on Friday, 2 March and the main guests will be 'Waterfall' and Steve Cooper. 'Waterfall' are a three-piece band on a tour of Britain. They play Guitar, Mandolin and Fiddle and have an LP about to be released. Steve Cooper plays Banjo and Guitar and is from the USA.

The evening starts at 8.00 pm prompt and it is held in the Coffee Lounge of the Restaurant. Everyone is welcome. Tickets are £1.20 at the door or £1.00 in advance from:

Steve Halliday	R24 Rm 1.23 Ext 492
Steve Cox	R25 Rm 2.34 Ext 407
John Ellis	R2 Rm 3.04 Ext 6689
George Pullinger	PTKBN 4 Ext 6661

Netball

We are thinking of reviving the Rutherford Laboratory Netball Team, to play one lunch-time a week. If anyone is interested please contact Miss S Gill, R20, Ext 495 or Mrs S Underdown, R1, Ext 443.



RUTHERFORD LABORATORY

BULLETIN

Deadline for Insertions

1000 hrs - Tuesday 6 March

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