

Bulletin

of the Rutherford and Appleton Laboratories

20 Oct.1980 No 15.

Rain at Chilbolton

Chilbolton is leading the world. A new concept in the use of radar for studying the effects of rain on radio communication, pioneered at Ditton Park, is being taken up internationally. This dual polarisation radar facility has been developed entirely in-house, and could be of benefit in many areas of communication and weather research.

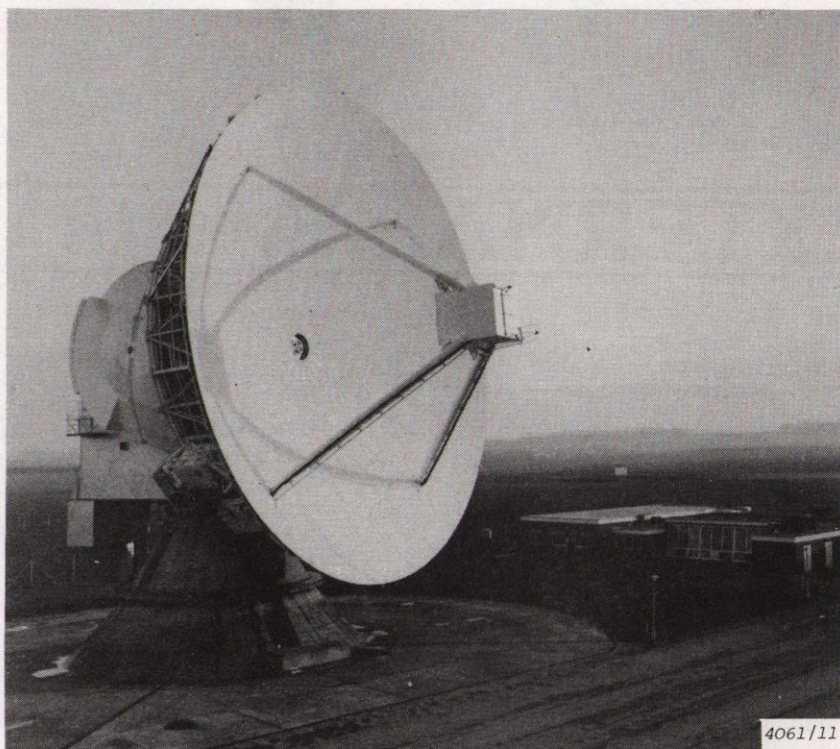
The Method

Rain can cause a very marked attenuation of radio waves, but up to now it has been impossible to exploit with high accuracy the potential of radar in mapping rainfall rates in three-dimensional space. However, by using the Chilbolton technique of transmitting alternate pulses on horizontal and vertical polarisation and then measuring the ratio of reflections on the two, rain may be distinguished from ice cloud (and from ground echoes) and ambiguity in determining rainfall rates can be avoided. In consequence, the attenuation due to rain on communication links from satellite-to-ground or ground-to-ground can now be accurately modelled using radar.

has Many Applications

Although studies of radio communication links are the principal application of the information from the Chilbolton facility, it should also be of importance to meteorologists, hydrologists, and others. The Civil Aviation Authority are interested in our data in connection with the impact of large rain drops on aircraft, and the detection of regions of supercooled water is also of potential aeronautical application, since their effects can be disastrous to aircraft.

The Met Office may decide to use the technique to avoid problems now experienced on a network of radars used for forecasting rain. Based on our experience, consideration is being



The 25 metre diameter antenna has a $\frac{1}{10}^\circ$ beam at 10cms wavelength, and the radar is able to accurately record the intensity and spatial distribution of rain.

given to incorporating the technique in the next generation of meteorological radars in the U.S.A. German, Austrian and Italian research centres are preparing to adopt the system, and an American group is attempting to upgrade their facility to compare with that at Chilbolton.

in Many Areas

The Met Research Flight and Ohio State University are currently working with us on studies of drop sizes in rain, which are fundamental to many practical applications, and interest has also been expressed by ESA and NASA in using the data in support of remote-probing measurements from satellites.

A data bank, accessible through the Atlas Computing Centre, is being used for studies of the Chilbolton data by Bradford University, with two other universities also interested.

A joint study is also being carried out with IBA who operate a 12 GHz satellite-to-ground link at Crawley Court, only 5 km from Chilbolton. First comparisons have been very encouraging, and the ESA have requested further studies to be carried out under contract. Plans are in hand to do similar work with the RAE, Farnborough, when they have completed their ground station (similar to that on the roof of R27 at Chilton).

We still have a world lead in this field, and with so many potential applications, we cannot work on the data fast enough.

INTERNAL Events

HEP SEMINARS

R61 CONF ROOM - 11.00 hrs

- 22 Oct Dr D Nicole/Pittsburg & Edinburgh
'The SU(2) Gauge Instanton Programme'
- 29 Oct Dr M Tyndel/RAL
'Results from WA24 on Charmed Baryons and Neutrino Oscillations'

ASTROPHYSICS SEMINARS

R61 CONF ROOM - 14.00 hrs

- 22 Oct Dr Ian Robson/Preston Poly
'Infra-red Astronomy before and after IRAS'
- 29 Oct Dr David Stickland/RGO
'Two Years Below the Balmer Jump'

HEP TECHNIQUES SEMINARS

R61 CONF ROOM - 14.00 hrs

- 23 Oct Dr P H Sharp/RAL
'Ring Imaging Cerenkov Counters'
- 28 Oct Mr C Balderson/RAL
'The New Software on the Laboratories' Workstation at CERN'
- 30 Oct Dr C J S Damerell/RAL
'CCDs as Particle Detectors'

NIMROD LECTURES

R61 CONF ROOM - 14.00 hrs

- 27 Oct Dr T Sandford/CERN
'CP Violating Parameters'

SPECIAL LECTURE

R22 LECTURE THEATRE - 15.00hrs

- 24 Nov Please note that this lecture has been postponed from 21 October to this new date:
Prof P A McKeown, Mr W J Wills-Moren & Mr H Modjarrad/
Cranfield Unit for Precision Engineering
'The SRC Ultra-Precision CNC Diamond Turning Machine for X-Ray ~~hologram~~
Mirrors'

EXTERNAL Events

NPD COLLOQUIUM

CONF ROOM H8 AERE - 15.15 hrs

- 23 Oct Dr P Butler/Liverpool
'Fission Induced by Grazing Collisions of a Very Slow and Very Heavy Nuclei'
- 30 Oct Dr T D Clark/Sussex
'Applications of Superconductivity in Electronic Devices'

THEO. PHYS SEMINARS

TPD 424.4 AERE - 14.00 hrs

- 21 Oct Dr G D Kaiser/Culcheth
'Consequences of the Accidental Release of Radioactive Material to Atmosphere'
- 28 Oct Prof. R S Scorer/ I.C.
'Complex Mathematical Models of the Atmosphere - Why Bother?'

ELEM PART PHYS SEMINARS

NPD - OXFORD - 14.30 hrs

- 23 Oct Dr R Marshall/RAL
'Strength of Neutral Currents at PETRA (JADE Experiment)'
- 30 Oct Prof. D H Perkins/Oxford
'Fragmentation Functions'

COMPUTERS AND NATURAL LANGUAGE

HP LECT.TH. OXFORD - 16.30 hrs

- 23 Oct Dr C Solomonides/Scicon
'Network Information Systems'
- 30 Oct C Scheybeler/SSC
'Computer Typesetting of Newspapers'

THEO. PHYS SEMINARS

CLARENDON LAB - OXFORD - 16.15 hrs

- 23 Oct Prof. U Smilansky/Weizmann Inst.
'Path Integral and Semi-classical methods for reactions between heavy ions'
- 30 Oct Prof. M J Rees/Cambridge
'Gravitational Collapse, Relativistic Beams and Quasars'

SOLID STATE SEMINARS

CLARENDON LAB - OXFORD - 14.30 hrs

- 23 Oct Dr M Warner/RAL
'Lattice Theories of Liquid Crystals'

ELEM PART THEO SEMINARS

NPD - OXFORD - 14.30 hrs

- 24 Oct Dr L Ibanez/Oxford
'The Scalar Sector in Grand Unified Theories'
- 31 Oct Dr G R Allcock/Liverpool
'Ultraviolet Stress Compensation'

SCHUSTER COLLOQUIUM

MANCHESTER - 16.15 hrs

- 29 Oct Prof. J Friedel/Paris-Sud
'Physics of Small Aggregates'

SHEP SEMINARS

SOUTHAMPTON - 14.30 hrs

- 22 Oct Dr K C Bowler/Edinburgh
'New Degrees of Freedom the Baryon Spectrum'
- 31 Oct Dr D A Ross/Southampton
'Multijet Events in QCD'

PART PHYS SEMINARS

BIRMINGHAM - 16.15 hrs

- 24 Oct D. M Pennington/Durham
'Perturbative QCD: How is it doing?'
- 31 Oct Dr R Phillips/RAL
'Neutrino Oscillations'

THEORY GROUP SEMINARS

DARESBUURY - 14.00 hrs

- 27 Oct Dr M Warner/RAL
'An overview of Liquid Crystal Theory'

HEP SEMINARS

DAMPT CAMBRIDGE - 15.00 hrs

- 24 Oct Dr M Green/QMC
'Strings and Supersymmetry'
- 31 Oct Dr I Halliday/Imperial
'Infra-red Problems in QCD'

ELEM PART PHYS

WESTFIELD COLLEGE - 14.00 hrs

- 23 Oct Dr P G Williams/Westfield
'Mesons, Glueball, Anomalies and the U(1) Problem'
- 30 Oct Dr J K Davies/Oxford
'Results from the European Muon Collaboration'

WHAT'S NEW?

Well to start with this logo is new and introduces a new series of Lectures to be launched by GEOFF MANNING on Wednesday 5 November. The idea is to give us all an opportunity to learn a little more about the many facets of interesting science in the RAL programme that fall outside the confines of our individual fields of work. The lectures should be an enjoyable relaxation rather than hard work (for the audience at least) and the venue will be R22 at 3.15 pm. Some dates for your diary are:

Wednesday 5 November: DR DAVID CLARK on 'Stellar explosions and the destiny of the Universe'. He is the new group leader for Astrophysics research in the Appleton Lab and the author of a recently published book on this topic. His talk will point out the RAL contribution to the study of supernovae and show their significance in the evolution of the Universe.

Thursday 27 November: DR FRANK CLOSE on 'Quarks and the Cosmic Onion'. Although he is in the theory division there is no cause for alarm as Frank Close is a specialist in the task of presenting the abstract ideas of fundamental particle physics research in comprehensible language. His talk will explain the basic ideas, outline the current state of the art and show the links with cosmology and the origins of the Universe.

Thursday 8 January: DR MIKE KEY on 'Laser driven compression and fusion'. The major experimental user facility actually operating on the RAL site at the moment is the laser. Mike Key's talk will explain what it is being used for and consider the implications of this line of research for miniaturising the H-bomb fusion process to yield controlled fusion power.

Thursday 8 February: MR RON LAWES on 'Ultra fine lithography for micro electronics'. Micro electronics has already had a revolutionary impact on our society but the miniaturising process has not stopped yet since electrons may do for lithography what the electron microscope did for microscopy. The possibilities in this area which are on the basis of the EBL activity will be reviewed by EBL director Ron Lawes.

Further talks in the series scheduled for later next year will be introduced in a future *Bulletin*.

Sportsday Prizes

The Rec Soc Prizegiving Ceremony held on Friday 10 Oct. was, as usual, a happy and relaxed affair, more crowded than ever this year. Trophies for the winners of the Outdoor Sports held at Harlington in the summer, the Indoor Sports held at Swindon in the spring, and the rose-bowl for the Laboratories Winter Crib Competition were all presented by the Society's President Dr Godfrey Stafford.

The Society's Chairman Dr Eric Thomas, welcomed Dr Stafford and thanked him for agreeing to present the trophies. 'We all know,' he said 'of the keen interest taken by our Director General, in all aspects of the sporting life of the Laboratories.'

Obviously enjoying the occasion, Dr Stafford remarked on the attractiveness of the design of the trophies. To many of the winners, he had presented trophies on previous occasions and seemed pleased at their continuing success. He was equally encouraging to new award winners. Bearing up remarkably well, after his marathon handshaking effort, Dr Stafford said that he had enjoyed the occasion. He was keenly interested in all sports, which did not necessarily mean he was any good, though he did remember once being in a winning team as a boy, when he had played left wing in a three cornered football competition. He still had a photograph of his winning side, and was very proud of it.

One thing he had wondered about, however, was what was going to happen in the next year or so when a majority of the SRC staff were quartered at Chilton.

Peter Craske Secretary of Rec.Soc. was able to assure him that competition would still be fair, as the Chilton staff would enter the competitions under at least three separate titles.



Dr Stafford helping the Summer Crib League winners, Tony Lubbock, Roger Childs and Ron Pike with their trophies. (34003)



and with as many more Trophy holders as we could get into the photograph. (33999)

Jim Reader Fund

We are pleased to say that the sum of £144 was collected and equally divided between the two charities "The Heart Foundation" and "The Cancer Research". Of this amount £50 was from the proceeds of the Families Day Shop.

Open Days Gift

The proceeds from the sale of "Quarks to Quasars" tee-shirts, amounting to £205.27, has been donated to the RNLI fund towards a new lifeboat for the Aldeburgh Station.

Angling

FISHING CHAMPIONSHIP

The usual hardy band of anglers turned out, and were blessed with a fine morning for fishing - cloudy and windless. It turned out to be the best match we have had, more fish being caught than in any previous match.

Peter Craske managed to find the better fish and retained his title, with John Thomson in second place and Denis Jacobs third.

Thanks

Les Martin of IRAS and Appleton would like to thank all his friends and colleagues at Chilton for their presents on his departure and for their good wishes. He would like to apologise to the friends he missed seeing in his last few days at work and hopes that he may meet them again on some future occasion.

Avez-vous?

If anyone has a copy of 'Ecouter et Parler' published in 1968, please contact David Bance R25 Ext 427

Chess

'Master' the computer chess program written by John Birmingham (CS&SD) and Peter Kent (Rutherford Laboratory), has been selected to compete in the 1980 World Computer Chess Championships.

BBC TV will cover the world championships for a special programme in the 'Master Game' series, to be shown in January 1981. The programme will include interviews with John Birmingham and Peter Kent on the value of computer chess in the development of artificial intelligence, and will feature a game between the 'Master' program and Bill Hartston, currently co-holder of the British Chess Championship (and champion in 1973 and 1975) and twice winner of the BBC Master Game competition.

Extract from Harwell Bulletin

Christian Fellowship

One of the most interesting of the New Testament letters is that written by the Apostle Paul to the church at Ephesus. It presents a picture of what the true Church of God is and how its members can work out their faith in practical terms of worship, work and relationships both in the home and marriage.

Ken Potter will be leading the first of a series of studies and discussions on Thurs. 20 October followed by Meyrick Wyard on Thurs. 30 October. Both meetings will be held in the R2 Conference Room (Top floor) starting at 12.30pm. All members of staff are warmly invited to come along.

Recreational Society

The method of resigning membership of the Association for ordinary members will now be as follows:- Resigning members must return their membership cards to the Association, either by post with a covering note, or in person at the Association Office. The Secretary will then forward a form, cancelling the membership deduction, to your pay office.

Think Hedgehog

Where do your plastic cups get to when you've finished with them? One or two have been found clamped tightly over the snouts of hedgehogs. If not found these little animals would have died of starvation. A little care in the disposal of these cups/yoghurt containers would alleviate this problem.

Think about it!

Trade Exhibition

There will be a one-day exhibition by Hakuto International (UK) Ltd, of their range of photomultiplier tubes of general interest to scintillator work and also photomultiplier tubes designed specifically for high energy physics. This will take place on Monday 24 November in Conference Room 2 from 10.00 to 16.00 hrs.

CERN Awards

WINTER COMPETITION 1980

These Awards are for suitably qualified scientists and technologists to enable them to work at the CERN Laboratory in Geneva. Applications for the next Fellowship Competition, for awards that would normally be taken up during the winter of 1980/81, must be completed before 18 November 1980. For further information and application forms, please contact Mr J D Walsh at SRC Central Office 74 Ext.2271.

Bulletin

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