Bulletin
of the Rutherford Appleton Laboratory
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SPECIAL

Nobel Prize Awarded for CERN Collider Work

The 1984 Nobel Prize for Physics has been awarded jointly to Carlo Rubbia and Simon van der Meer of CERN, for work which was crucial to the discovery of the W and Z particles. The Nobel Prize is universally regarded as the highest distinction in science.

This is very good news for RAL and for the UK particle physics community. RAL together with Queen Mary College and Birmingham University participated in the work which resulted last year in the discovery of the W and Z particles.

In 1976 Rubbia and co-workers pointed out that it should be possible to convert the CERN Super Proton Synchrotron into a collider capable of giving sufficient energy to create the W and Z particles. To do this it was necessary to collide the protons with antiprotons. This required the development of novel techniques, since antimatter is not normally found in our world and must be created in collisions. The antiprotons which are created using another CERN accelerator, the Proton Synchrotron, must be accumulated and stored for longer than one day to produce the required intensity, and made into a narrow parallel beam using cooling techniques. Early work on beam cooling came from Novosibirsk Laboratory in the USSR and used a technique called electron cooling. Originally this technique was pursued by CERN with some outside collaboration, including physicists from QMC. However a brilliant, and completely different technique, stochastic cooling, was invented at CERN by van der Meer, and this proved to be more suitable and was adopted.

Rubbia persuaded the CERN management to embark on the conversion of the SPS. This was approved in 1978. It was finished in 1981, remarkably rapidly, and on a relatively low budget, for an ambitious project which increased the SPS available energy by a factor of 20. Rubbia also embarked on the task of forming a collaboration which would be sufficiently powerful to design and construct a detector capable of finding W and Z particles. Discussions took place in Autumn 1977 with Alan Astbury, Peter Kalmus and John Dowell, and as a result, groups from RAL, Queen Mary College and Birmingham joined the project, which later became known as UA1. Initially the collaboration consisted of about 50 people from 9 institutions. By 1983 it had grown to around 140 people from 12 institutions. For several years, until his departure to Canada, Alan Astbury was co-spokesman with Rubbia for the collaboration.

Carlo Rubbia CERN. 063-08-83

Simon van der Meer CERN. 303-01-84.

In addition to the original discoveries, the W and Z particles have now been detected via several different decay modes by UA1 and their decays into electrons have been seen also by the UA2 experiment. The collider is used by several other collaborations one of which, UA5, includes a group from Cambridge. In addition to the high energy experiments at the collider, the cooled antiprotons are used by a large community of physicists at the LEAR machine, where different groups from QMC, Birmingham and RAL are playing leading roles.

The collider is running again at present. The UA1 experiment which has been improved, particularly for muon detection, is clocking up W particles and other interesting events at a good rate. Additional groups have joined including one from Imperial College. The collider itself will be upgraded by the addition of a new collector ring for antiprotons which should give a significant increase in beam luminosity in 1987. To match this, improvements to UA1 are in

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Nobel Prize *(cont'd from p1)*

progress, and approval is being sought for an ambitious upgrade of the calorimetry and triggering to meet the challenge of new physics.

In addition to giving our warmest congratulations to Carlo Rubbia and Simon van der Meer for their well deserved honour, we would like to extend these congratulations to include the many people at RAL, Queen Mary College and Birmingham University, who played some part in this exciting adventure.

P I P Kalmus

RAL Lectures

This lecture will be held on Thursday 8 November at 3.15 pm in the R22 Lecture Theatre.

'PRESENT SUPPORT and STATUS of SCIENCE TECHNOLOGY UK:

by

Professor Sir Ronald Mason, KCB, FRS
University of Sussex

There is an increasing volume of concern for the forms and mechanisms which support basic and strategic research in the UK. A recognition has been made of the poor record of UK industry in the support of R & D. Arguably, some of us feel that the UK has slipped from its pre-eminent research position of 10-15 years ago and that priorities allocated to technology and engineering are not being reflected in industrial/economic performance.

A review of these topics bordering on the provocative will be presented.

Library Notice

The Librarians are none too pleased with the person who removed the book entitled "Laser Interactions and Related Plasmas Vol. 6" Hora/Miley from the Library about a month ago. As it cost the Library £95, they have no intention of replacing it. They apologise for the inconvenience and strongly suggest that it is returned.

Another book has disappeared from the display shelves in the Atlas Library. The book is 'Programming with FORTRAN IV' 2nd edition, by B S Gottfried. Please let us have it back!

Missing

The following item is the subject of a loss report.

Weatherite 10" desk fan
Inventory No. V008432

Please ring A J Hall, Ext. 6531 with information.

INTERNAL Events

CONDENSED MATTER SEMINARS
R3 CONF ROOM - 1330 hrs

13 Nov G A Saunders/Bath
'Ultrasonic Investigations of Ferroelastic Phase Transition'

20 Nov G Groves/Oxford
'Developments in Cement'

27 Nov R Ottewill/Bristol
'Small Angle Neutron Scattering on Colloidal Suspensions'

RAL TECHNOLOGY LECTURE
R22 LECTURE THEATRE - 1500 hrs

22 Nov Dr John Lawson/RAL
"New Techniques in Particle Acceleration"

GEOPHYSICS SEMINARS
R68 CONF ROOM - 1400 hrs

13 Nov Dr P Williams (UCW, Aberystwyth)
'The EISCAT Project'

27 Nov Dr D Bryant/RAL
'Preliminary Results from AMPTE'

JOINT THEORY SEMINARS
R3 CONF ROOM - 1330 hrs

29 Nov M S Longuet-Higgins/Cambridge
'Some Coastal Processes - Fast and Slow'

ASTROPHYSICS EVENTS
R68 CONF RM - 1400 hrs

21 Nov Dr Hugh Summers/JET

28 Nov Dr R N Manchester/Jodrell Bank
'Pulsar-Supernova Remnant Associations'

EXTERNAL Events

SEMINARS IN PLASMA SCIENCE
DEPT. ENG. SCIENCE - OXFORD - 1615 hrs

13 Nov Dr P C Stangeby/Toronto
'Probes in Tokamak Plasmas'

20 Nov Dr A Montes/INPE Brazil
'Current Drive Using Electron Bernstein Waves.

27 Nov Mr N Malik/Oxford
'Experiments in Low-current Vacuum Arcs'

PHYSICS COLLOQUIA
CLARENDON LAB - OXFORD - 1615 hrs

9 Nov Dr T D Beynon/Birmingham
"Neutron Holography"

16 Nov Dr A F Clark/NBS Boulder
'Superconductivity - Past, Present and Future'

23 Nov Prof D H Perkins, FRS/Oxford
'The Tenth Anniversary of Charm'

ELEM PART PHYS SEMINARS
NPD - OXFORD - 1430 hrs

8 Nov Dr S Sarker/CERN
'Cosmological and Experimental Constraints on the τ Neutrino Mass and Lifetime'

Bulletin

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