Bulletin
of the Rutherford Appleton Laboratory
1 May 1984 No.7

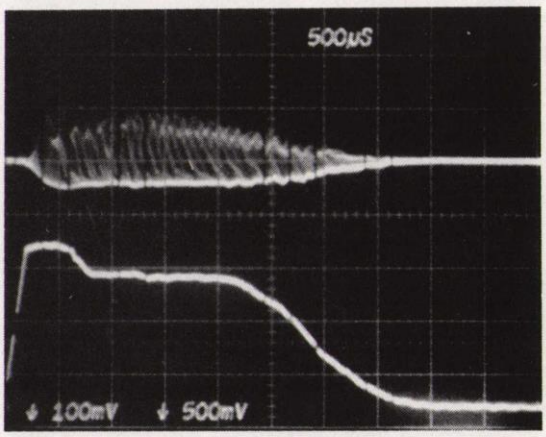
Singular Success for SNS

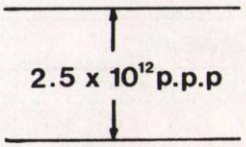
Once again, the SNS has successfully cleared a major hurdle at the first attempt. On Sunday 8 April, using 2 of the 6 radio frequency (RF) cavities that will eventually drive the synchrotron, protons were accelerated in the ring for the first time. Such an achievement illustrates the tremendous dedication to the project by everyone involved, and marks a critical step in the commissioning programme which aims to produce neutrons by the end of 1984.

Following earlier successes with the magnet ring, vacuum equipment and power supplies, and the observation of a circulating beam in January (see Bulletin 31 Jan 84 No 2), the 2 RF cavities had been commissioned to provide the critical conditions needed for the trapping and acceleration of protons.

So, on Sunday 8 April, with beam injected and circulating once every 2½ seconds (repetition rate reduced to minimise activation of machine components), the RF system was switched on and protons soon shown to be accelerating for over 3 milliseconds for each 250 microsecond injection period. This is just as predicted for 2 cavities, and corresponds to protons being accelerated to 140 MeV. During these initial trials, the maximum intensity recorded was 2.8×10^{12} protons per pulse, which is already more than 10% of the final design figure. Such a significant fraction of the design intensity at this early stage of commissioning of a synchrotron is quite outstanding. Two more cavities will be brought into action in the next few weeks for acceleration to 550MeV.

With the completion programme now rapidly gathering momentum, the next stage will be to extract accelerated protons and focus them on the neutron producing target at the target station. This is expected to be ready at the end of the year, and initial exploitation of the SNS should follow soon after.





The bottom trace shows the signal from a toroid in the SNS. This senses total current in the machine. The current is seen to rise linearly during the injection period of 250 μsec. Bunching of the ribbon - like beam occurs during the next 500 μsecs; acceleration then proceeds (with a slight loss of beam) for the next 1.5 msec. Thereafter the beam is gradually lost as the field rises beyond the accelerating power of the 2 RF cavities.

The top trace is that of a pick-up electrode which is only sensitive to a discontinuous beam. Thus the signal rises during the bunching period, is constant while there is no loss of beam, and falls as the beam is gradually lost. The oscillations on this trace are due to synchrotron oscillations - the bunches grow and contract at a characteristic frequency which is of the order of 1 KHz.

Film Badge Notice

It is period 5. Colour strip PURPLE
Please be sure you are wearing the correct dosimeter, and that old ones are returned.

INTERNAL Events

NIMROD LECTURES
R61 CONF ROOM - 1400 hrs

14 May F Close/RAL
'Dynamical Rescaling and Lepton Scattering from Nuclei'

21 May C Heusch/UC Santa Cruz/CERN
'Radiative Decays of the J/ψ

HEP SEMINARS
R61 CONF ROOM - 1100 hrs

2 May D Morgan/RAL
'Bumps and Dips and the Search for Glueballs'

9 May P Kasper/RAL
'Observation of Higher Twist Effects in Antineutrino - Neon Interations'

16 May G Shore/Imperial
'Vacuum Alignment in SUSY Gauge Theories'

ASTROPHYSICS SEMINARS
R61 CONF RM - 1400hrs

2 May Dr Michael J Barlow/UCL
'The Evolution of Stars to Planetary Nebulae, in the Magellanic Clouds'

COMPUTING SEMINARS
COLLOQIUM - ATLAS CENTRE - 1515hrs

8 May Prof John Murrell/Sussex
'Computing in the Science Board Area: Future Requirements'

EXTERNAL Events

CHERWELL - SIMON LECTURE 1984
ZOOLOGY BLDG - OXFORD - 1630hrs

18 May John Houghton, CBE,FRS
'Ozone, Weather and Space'

PHYSICS COLLOQUIA
CLARENDON LAB - OXFORD - 1615hrs

11 May Prof H Ehrenreich/Harvard
'The Recent Development of Photovoltaic Energy Sources'

25 May Prof Sir Ronald Mason, KCB,FRS /Sussex
'Emerging Defence Policies and their Dependance on Physics - based Technologies'

ELEM PART PHYS SEMINARS
NPD - OXFORD - 1430hrs

3 May Dr R Marshall/RAL
'Separation of Flavours in e^+e^- Reactions and its Applications'

10 May Dr A K Nandi/RAL
'The Latest Results on UA1 Events'

Missing

The following items are the subject of loss reports. Will anyone having information please contact the enquirer.

Sixteen integrated circuits
Type P2114-AL2

to J H Hunt, Ext 6115

A Fluke 8050A DV.M
Serial No. 2733315

to D A Cockerill, Ext 6248, 5301.

Precision Trimmer (blue), EISCAT written on the base. Last seen R20, G&R Division. Information on its whereabouts to Mr S Crothers Ext. 6519.

Sales to Employees

The sale of scrap metal and plastics, will take place (subject to the usual conditions) on 11 and 25 May at the R40 scrap compound from 12-1230 hrs.

Le Nom Nouveau

Monique Ferrandier (formerly Mrs Ashby), who has taught French at RAL for the past ten years is now Madame Ferrandier-Smith following her marriage on 7 April to Dr P F Smith of HEP division. (Dr Smith wishes to remain to be known as Dr Smith).

Obituary

Fred Coleman

Former Falklands staff were very shocked to learn that Fred Coleman had been killed at the age of 86, in the recent fire at Stanley Hospital.

For some fifteen years as Observatory Handyman, he was with typical Kelper ingenuity, a one-man Engineering and Works Department and also, mysteriously managed to run his shop without being noticeably absent from official duties.

We pay tribute to him and his fellow victims, particularly remembering Nurse Chick, who gave her own life in an attempt at rescue.

Indoor Sportsday 1984

Sportsday was held this year on 30 March at the Crystal Palace National Sports Centre. The event was organised by RGO, hence the venue. It was the nearest centre to them, which could give the facilities required. Over 70 travellers from RAL took part and, as usual with the Indoor Sports, were very successful.

BADMINTON (Mens doubles)

The event has been dominated by Rutherford ever since the first Sports-day. This year was no exception. At least this time we had a different pair as winners. Roger Wolfenden was unable to partner Dave Wootton, so last year's runners-up Richard Lawrence and Alan Stevens won the event in fine style.

BADMINTON (Mixed doubles)

Here again RAL dominates, usually with Kay Knight and various partners. This year as in the men's event we had a change, Pam Richens and Garry Allan emerging the winners. (Not the way to win the undying affection of your new Mother-in-Law Garry!)

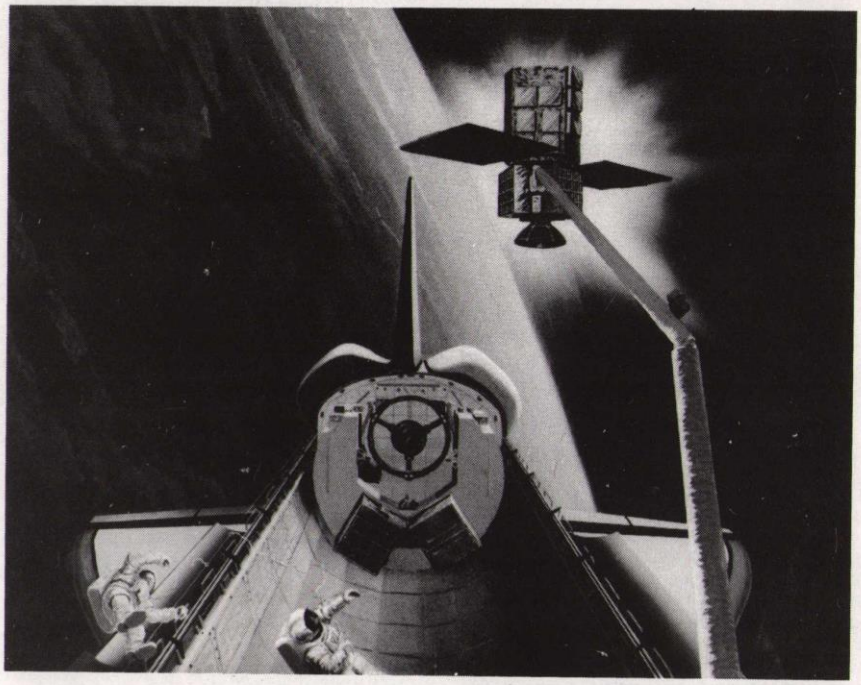
DARTS

RAL were at it again. The lunch-time practice sessions of the R18 team proved decisive, Messrs Morgan, Buckel, Jones, Roberts and Fisher carrying all before them.

BRIDGE

At last, we at RAL have captured the prestigious Bridge Trophy for the

Successful Repair of Solar Max



A previous *Bulletin* article *(No 5, 27 March 1984)* described plans for in-orbit repair of the solar flare observatory Solar Max (sometimes called SMM) and many will have followed progress of the repair mission on TV and in the press. The picture shows redeployment of Solar Max at the conclusion of a mission which is the first in a new era of in-orbit satellite repair and maintenance.

A Press Briefing was held at RAL on Tuesday 3 April, prior to the Shuttle launch on Friday 6 April. At the briefing, representatives of the press, radio and TV were addressed by Dr Geoff Manning (RAL), Dr George Simnett (Birmingham University), Dr Alan Gabriel (RAL) and Dr John Parkinson (Mullard Space Science Laboratory or MSSL). Birmingham University are responsible for the UK part of the Hard X-ray Imaging Spectrometer on Solar Max and MSSL have collaborated with RAL on another Solar Max instrument, the X-ray Polychromator or XRP.

The repair mission achieved all its objectives but one - the Shuttle had insufficient fuel to allow Solar Max to be boosted to a higher orbit. However, at the start of the repair things went badly and the chances of success looked small. The problem was that astronaut George Nelson, using a jet powered back pack and a special docking attachment, could not dock with Solar Max. His docking attachment could not be made to grip the docking pin on Solar Max. In a desperate effort to stop Solar Max spinning he grabbed a solar panel and used his back pack thrusters but this only made matters worse - Solar Max was still spinning but now with a precession which meant that soon its solar panels would no longer face the Sun and consequently would no longer generate power.

The astronaut's attempts to capture Solar Max were abandoned and the spacecraft heaters were switched off to conserve battery power. Solar Max's magneto-torquers were then used to point Solar Max at the Sun once more and to put it in an attitude which would allow capture by the Shuttle's remote manipulator arm. Fortunately, this was achieved before the batteries ran flat - but only just!

On Wednesday 11 April, 3 days behind schedule, Solar Max was captured using the arm and berthed in the Shuttle's cargo bay. From here on the repairs went according to plan and exceeded expectations - even the very difficult repair to the Coronagraph/Polarimeter's electronics was accomplished with no problems.

So far (18 April) the calibration of Solar Max's new attitude control system and the process of turning on the instruments have both proceeded without problems. XRP was turned-on and its microprocessors reloaded on Sunday 15 April; observations of Solar Flares are expected to restart at the end of April.

The scientific aims of Solar Max and XRP and some of XRP's advances during the previous operational period were outlined in the previous *Bulletin* article. The repair gives us an opportunity to run the more complex and demanding observing sequences which were being developed when the attitude control system failed. We are hoping the new period of operations will be as successful as the spectacular repair.

Further information on XRP or the repair can be obtained from Dr A H Gabriel (Extension 6206), Dr J C Sherman (Extension 6367), or Mr R F Turner (Extension 6433).

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first time with combined entries from Appleton, Atlas and Rutherford all entered for RAL as six pairs, after some last minute re-shuffling of partners. As a result some pairs had not played more than a couple of times together.

In a very tight enjoyable play of 24 boards lasting several hours and after all points had been totalled up Tony Gibson (G&R) and Cliff Pavelin (Computing) emerged as winners with last years winning pair of Barry Martin and Gordon Rowe of Central Office coming second and Dorothy Irvine (Instrumentation) and Hari Shah (G&R) came third.

TABLE TENNIS

Our days of triumph in this event seem to have gone. The holders, RGO, retained the Cup for the second year. (Looks like old age has crept up on our players).

CRIB

This is another event at which we excel. The defending Champions, the two Steves (Handcock and Stoneham) won with the very last hand of the day.

One of the losing team was then seen to retire to the swimming pool and dive off the top board - to great applause.

SQUASH

The squash championship changes hands regularly at each sports day. This year a combined team from Swindon and RAL emerged victorious from a close competition, winning by one game from the Rutherford 'A' team.

CHESS

Only one entry (P Craske) so the event wasn't held. What has happened to all our Spaskys?/Spaskii?

SPECIAL AWARD

Each year a presentation of the 'Sir Geoffrey Allen Perpetual Award' is made to a person or single group of people who, in the opinion of the Sports and Social Association committee, has made the greatest contribution in the previous calendar year to the Council's sporting or social activities.

This year's winner was Ian Forster (RAL). Well done Ian, a well deserved award.

P Craske

More Goodbyes

The history of RAL and the career of Dennis Pickles are inextricably entwined. Dennis joined the Lab from Harwell (with the PLA) in 1961 as a draughtsman and as the Lab grew and diversified so did Dennis' work. From the 'good old days' of Nimrod, through his bubble chamber period, polarised target work, superconducting magnet involvement to his current task on the Millimetre Telescope, his career has reflected the changing expanding character of the Lab.

On Wednesday 28 March, the Pickles era sadly came to an end, when his many friends and colleagues gathered to say farewell. Dr Gordon Walker making the presentation of a high-Tech woodworking machine, and a specially mounted ring-bolt (obviously an In-joke), thanked Dennis for his 31 years of service and wished him well in his retirement.

From the traditional Ray Roberts leaving card depicting Dennis' hobbies of model making, amateur dramatics, wine making, rallying etc, it was very obvious that his future would be far from dull.

Starting his 'thank you speech' with the enviable phrase, "We pensioners ....." Dennis continued, to explain that the Pickles era had really existed. His father, brother and wife had all been involved in the AERE/SERC set-up. He had enjoyed his 31 year connection, had made many friends and was sorry that it had to end. He hoped the Telescope project would soon reach a satisfactory conclusion - Mauna Kea willing - and wished all present the best of luck for the future.

Mike O'Connell, whose retirement presentation took place on Friday 30 March, was no Lab freshman either. He joined us in 1962 and soon became heavily involved with the computing side of high energy physics.

Mike made substantial contributions to the study of beam extraction efficiency on Nimrod, did sterling work for CERN and invaluable injection studies on the 800 MeV beam line of SNS. His last project, the Faint Object Camera is now approaching its finale.

"He will be missed", said Peter Vaughan, who was making the presentation, "for his undoubted mathematical expertise and in addition for his gentle Irish wit. Without embarrassing you any further", he continued "we would like to give you this to remind you of how very many friends you do have".

This, was a calculator together with a card, for which Mike thanked everyone. "It is so nice to see all my friends here", he said. "Co-operation and mutual help has always been the strength of the Lab, with help forthcoming, even from strangers. This I shall miss, but shall keep in touch. Thank you all".

Cricket Practice

Weather permitting, cricket practice will take place at the net, by the East Car Park, every Tuesday evening from 10 April onward. The start will be at 17.30hrs approximately and everyone is welcome.

For further information please ring Nick Myer, Ext 5115.

Angling

FINAL RESULTS of the SEASON

A good season! We had a good turn-out in most matches with the Championship being decided at the last match of the season.

The 1983-84 overall champion was Malcolm Davies, Darryl Taylor took the 'Ernie Russell' Cup, and also the Christmas Competition and the 'Pairs' match was won by Malcolm Davies and Peter Craske.

Congratulations to Malcolm for a great result in his first full season in the Championship. He managed to catch fish in the crucial last two matches when the going was very tough and b..... cold.

Darryl won the other two main Competitions by coming back to something like his old self (remember the Stour).

Thanks

Sue Carter (was Bond) would like to say thank you to all her friends and colleagues who kindly contributed to the lovely Wedgewood tea-service given to her as a wedding present.

'100' Club

These prizes have been paid out over the past 18 months, since the draw started.

Mr R Bell	R12	£25
Mr A V Hipwell	R18	£25
Mr M Bennet	R18	£125
Mr A Wells	R18	£25
Dr J E Harries	R25	£25
Mr W L Almond	R12	£25
Mrs M Gilbert	R1	£125
Mr T Morgan	R18	£25
Mr C Bruce	R12	£25
Mr L Patton	R18	£25
Mr R Jones	R3	£125
Mr R Hope	R65	£25
Mr A V Hipwell	R18	£25
Mrs A Donkin	R25	£25
Mr P Coleman	R20	£125
Mr J Rice	R2	£25
Mr R Hope	R65	£25
Mr K Louch	R8	£25
Mr P Champ	R51	£125
Mr S Stoneham	R2	£25
Mr A V Wells	R18	£25
Mr L Willson	R18	£25
Mr M Butler	R3	£125
Mrs A Steer	R1	£25

At the moment we have a few spare numbers, so if anyone who is a member of RAL RecSoc would like to take part, please contact T Morgan, R18, Ext 5563.

Bulletin

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Deadline for insertions: