Minutes

Charissa Group Meeting

Meeting held on: 26 September 1994

Meeting held at: Birmingham

Present:	BRF(Chair),DLW,WNC,NMC,MF,SJAH,RAH, CDJ,JK,ACM,VP,WDMR,GT
Apologies:	RAC,GJG,JSL,RPW
Distribution:	Those above plus DDW, all by e-mail/file-server + S. Metcalf.

Minutes

1. **Minutes of meeting of 27 April 1994:** accepted
2. **Matters Arising/ Actions:**

   All actions were deemed to be covered satisfactorily.
3. **Update on NPC/EPSRC matters:**

   A meeting (21 September) had been called by G. Morrison in Birmingham for NPC and Program representatives to discuss future administrative matters with EPSRC representatives. The EPSRC structure and personnel were not decided. Nuclear Physics was likely to operate as a coordinated program. Advice on 1995 studentships was expected before January, with no major changes anticipated.
4. **Reports on the current grant spend:**

   The four university grants had been fully spent: Birmingham, York, Surrey and Oxford. Hardware components for new modules, data acquisition and chamber were now purchased, and remaining costs were mainly construction (for phase 1 of the MEGHA array).

   Paragraph summaries on individual grant spends to be forwarded to BRF.
   WDMR,WNC,DLW

   A summary of any outstanding small items for the new electronics to be produced. RAH

5. **Report on physics experiments in July running period:**

1. $^{16}O+^{16}O$ run: MF reported. Two hybrids with 20μm anodes and no rear grid were employed with $B_2O_3/^{nat}C$ targets. Li_2O targets had been too thick and SiO_2 failed in beam. The ^{24}Mg+^{8}Be channel was not seen (^{8}Be transfer) but ^{28}Si$^{*}+\alpha$ channel looks very promising (^{16}O+ ^{12}C breakup). Lighter target contaminants excluded by HI identification and mass of channel, and by momentum gating.

2. $^{12}C+ ^{24}Mg$ run: WNC reported. Same setup as above, but gains increased to look at ^{12}C down to 10 MeV. SMS has got calibration coefficients and has seen Q_{ggg} for $3\times^{12}$C final channel. Disagreement in yield between March and July runs to be resolved. Some peculiarities in ΔE–E spectra which don't seem to appear in MF data; discuss with MF. $\boxed{\text{WNC,SMS}}$

3. MEGHA tests: DLW reported. Tested with 150 MeV ^{24}Mg beam on ^{12}C and prototype module in 2m chamber. Two Intertechnique sheet PSD's. Details of test results in P. Lee first year report. Pepper-pot mask in front of PSD's allows correction of pincushion distortion, but resolution is inadequate outside of central 30$\times$30 mm^2. Reconstructed E_{tot} spectra agree with GJG data, when extra high energy peak associated with distortion is excluded. The gas ΔE sections appear to work at least as well as the hybrids. The scintillators were not tested due to a cabling problem that is now resolved. The new preamplifiers were not tested due to a wire break in the power lead. Tests employed original-style preamps.

4. $^{24}Mg+ ^{24}Mg$ γ–ray tests: NMC reported. The tests were exploratory, in preparation for a ^{48}Cr search. Four 5"$\times$6" NaI's were shielded by 1cm Pb and Li_2O absorbers and mounted on the small Line 2 chamber in close "windmill" geometry. The Cormier resonance at E_{cm} $\sim$25 MeV in ^{12}C+ ^{12}C scattering was reproduced in the coincidence 4.43 MeV yield. The ^{24}Mg+ ^{24}Mg running, for 36 hours, was being analysed. Statistics were low, but the background was also a problem and the method will not be pursued, particularly since neutron damage was observed in the CAESAR array.

5. Shipping/Hardware Update: The return shipment was discussed. It had been held up in UK customs. It was agreed that future shipments should go out of the UK and back in via the same port, and that Manchester was the best choice.

The shipment was unpacked. High gain preamps to be found. $\boxed{\text{SJAH,DLW}}$

Three Silena ADC's had been sent to Southern Scientific by RAH, and a report was awaited. This leaves 9 ADC's at the ANU.

The situation with defective high voltage supplies was in hand.

Exabyte drives that gave problems had been brought back and repaired.

NMC was trying to locate a supplier of stainless steel 8BA studding for target mounting.

The *next run's preparation* should begin by removing all cables and checking for earth loops in the chamber. NMC has a supply of copper braid that could be used for earth strapping.

6. **Update on status of detectors and equipment at ANU:**

RPW had forwarded a document (Ch/Doc/94/12) detailing the equipment stored at the ANU. This was tabled. WNC to circulate with minutes. $\boxed{\text{WNC}}$

All the Hamamatsu strip detectors had been used, so there are no unused strip detectors.

7. **Progress with MEGHA tests:**

   i. *Modules:* recent prototype tests were discussed under Item 5.3. DLW reported that the remaining modules should be ready by Jan 1995.

   ii. *Chamber Design:* a booklet of MEGHA engineering drawings had recently been distributed to all institutions by S. Metcalfe. The meeting wished to record its appreciation of his effort in producing these drawings and the booklet.
   The detailed design was discussed with reference to drawing A0–82/10146. Some parts were ordered and quotations had been received for other parts that would be contracted out. Pumps were on order. The support frame was in hand. DLW estimated that the basic chamber should be completed (with blanking flanges) by the end of December.
   Further design work was needed to address strip detector mounting, and possible position calibration masks.

   iii. *Detectors:* 20 Hamamatsu detectors had arrived at Birmingham. DLW offered to take them to York for testing. $\boxed{\text{DLW}}$

   iv. *Gas Supply:* this had advanced to a sufficient stage, and further effort would await assembly of the chamber and modules at York.

   v. *Beamline on Linac at the ANU:* **ITEM ADDED TO AGENDA**
   BRF had agreed with the ANU in July that a single triplet would be employed on the Charissa linac line. The line would be essentially identical to the other line, but slightly longer. ANU will install the line and instrument it. Valves, pumps, power supplies, switch gear and quadrupoles to be shipped as soon as possible. $\boxed{\text{JK}}$
   Beam out of the linac was expected by September 1995. Beam line construction would follow this (although there was an intention to bring this forward if manpower became available).
   The above schedule implies that one or two running periods with the existing beam line arrangements will be required.

8. **Progress with electronics:**

DLW reported. The bias supplies were all made and the controllers worked remotely. The parts for the preamps were about to be ordered and a manufacturer would be identified soon, to do the assembly. York now had the capability of repairing surface mounted units.

WDMR reported regarding amplifier work at Oxford. The layout is almost complete. Prototypes, probably half a crate, should be complete by the end of the year.

9. **Progress with data acquisition:**

   (a) *Recent beam tests of new AIM and CAT units:* M. Freer tabled a discussion document summarising the tests conducted in July at the ANU. Signals had been sent in parallel to the old system and to the new system comprising Amplifier Interface Modules (AIM's), Converters of Amplitude to Time (CAT's) and Lecroy 2277 32 channel multihit TDC's. Pulser and beam tests were performed. The pulser tests enabled a comparison of linearity and resolution between the two systems. They had very similar performance, both deviating from linearity only below ~10% of the range. The elastic scattering showed a loss of counts in the new system but this was believed to be an artifact of the test procedure.

   The success of the tests met with general acclaim. The results would be prepared for a Charissa document and a NIMs article. **MF**

   A document would be prepared, summarising the advantages of the new system in terms of savings and versatility in coincidence logic and timing (savings in provision and effort for setting up), and overall performance. **RAH**

   (b) *FETCH module and Data Broadcasting:* (thanks to VP for the text)

   The fetch module and HSM were installed in ANU in June. They functioned perfectly and were used for the experimental runs. These are now considered a standard part of the data acquisition system.

   Phase 1 of the conversion of the DA system to a new windows driven environment was installed. The system is now a hydrid with the *grafterm* session being used for readout control, online sort and spectra display and with the new software being used for control and monitoring of the tape subsystem. The new software can also be used for spectra display and analysis and conversion from the old SDB format spectra to the new Eurogam format spectra is available.

   The software to drive the ethernet interface to be used for broadcasting the online data to the workstations, for sorting, was written and tested in ANU. Additional ethernet interfaces were installed in the 2 Sun workstations and a private 'data' network set up. Blocks of raw event-by-event data were broadcast by the data acquisition system and reconstructed in one of the Sun workstations.

   For the next round of experiments at ANU (February/March) it is intended that the data acquisition system be essentially unchanged but that in parallel an online sort be available in the Sun workstations. The old online sort in the DA system can thus be used as a comparision against the new Sun-based one. $\boxed{\text{VP,SJAH}}$

Assuming this is succesful then for the following round of experiments (June/July) the *grafterm* session will be fully removed from the DA system and all setup and control of the experiment will be via the new windows based system.

IMPORTANT: extra note added to minutes

Several of the fans in the computing experiment were found to be faulty and were replaced during the July 1994 running. In particular the fan in the 2 Gbyte disc attached to the Sun workstation (the server) had failed. It is important that someone check fans at the start of each period at ANU and get any faulty ones replaced. If this is not done equipment may overheat and fail with serious consequences. $\boxed{\text{SJAH}}$

10. **Plans for future experiments/running at the ANU:**

    (a) *Beamtime request for ANU:* it was agreed that BRF would produce a joint submission to the program panel. The meeting felt that it was inportant to stress the fact that the collaboration's entire program had been relocated to Canberra. WDMR had provided some suitable input. Others were to provide short details to BRF by 3 Oct. $\boxed{\text{DLW,WNC,NMC,MF}}$

    (b) *Timing for Running:* DLW reported that Canberra expected delivery of new coils for the analysing magnet in Feb 1995, and would want to install them very soon thereafter. This would clearly affect the times available for running.

    (c) *Number of Data Channels:* after discussion, it was agreed to limit the system to 128 channels for Feb/Mar 1995 running, and to leave the tape format the same. The following enhancements would, however, be required at that time:

    A repeater or similar device to avoid need for extra termination. $\boxed{\text{RAH}}$

    Software for SUN sorting to work in parallel with GEC sorting. $\boxed{\text{SJAH,VP}}$

11. **Discussion of other experiments (Vivitron, Orsay, GANIL):**

    (a) *Vivitron:* The Charissa chamber would be shipped to Strasbourg on 11 October. Labour would be required for the installation, to supplement RAC and C. Leyland. A meeting was required at DL on Wednesday 12 Oct, to discuss details. $\boxed{\text{RAC,JK}}$

    Power supplies at Daresbury need modifying. Danfysik would do this and then deliver them to Strasbourg on a 4 week timescale.

    It was understood that Strasbourg would supply services to the Charissa area and that the UK would install the beamline. DLW pointed out that smaller groups would have to enquire about special arrangements for funding travel for technical staff.

It was anticipated that the Charissa line would be ready for use by the end of January 1995.

Data acquisition and electronics: SJAH was assembling a duplicate of the interface with 64 adc channels. Standard NIM amplifiers would need to be used, although some could possibly be borrowed from the ANU setup after the Feb/March running.

A secure storage system would be required within the Charissa area.

Proposals for 17 October round: BRF reported that he was involved with two near-the-barrier proposals; DLW reported that beam tests with the new MEGHA modules and new PSD's would be requested, combined with a physics proposal.

(b) *Orsay:* DLW reported that this was scheduled for the last two weeks of November at present. CDJ or a new student would analyse the data. The French collaborators were providing the electronics.

(c) *GANIL:* WNC reported on a run scheduled for mid November to search for halo structure in ^{19}C and ^{17}B. It was planned to incorporate one of the Charissa style sheet PSD's into the setup. The participation in this experiment was of a preliminary nature and was hoped to lead to more involvement.

12. **Report from Strasbourg Conference:**

Recent Charissa work had been represented in 8 posters and 3 invited talks at the 6th International Conference on Clusters in Nuclear Structure and Dynamics, Strasbourg, 6–9 September. It had been the subject of much interest, from Japan and elsewhere.

13. **Publications and Talks:**

The list describing current analysis and preparation of publications was reviewed in its absence (Ch/Doc/94/10). It has been updated with comments from the meeting and is included as Table 1.

Analysis was in progress for the following experiments: $^{12}C+ {}^{12}C^*$ (RPW), Ang. Dist. (SPC/DLW), $^{40}Ca+ {}^{16}O$ (SMS/WNC), $^{12}C+ {}^{24}Mg$ (SMS/WNC), $^{28}Si/^{32}S$ (NC/NMC), $^{12}C+ {}^{12}C$ Ex Fn (CDJ), $^{12}C+ {}^{16}O$ Ex Fn (SPF/DLW), $^{16}O+^{12}C$ res (GJG), MEGHA tests (PRL/DLW).

14. **Any Other Business:**

(a) *Lunch:*

It was noted that, not only was no lunch provided (same as last time) but there was no water supply in the building either.

Table 1: Review of Status of Experiments

Experiment	Analysis	Comment & Status	Action
^{23}Na data	NSJ	PRC paper. Ref report received	DLW
^{16}O target	CDJ	In final form for PRC paper	CDJ
Texas data	JTM	Written, submission Oct	BRF
Higher Ex	MJL	Complete and ready to submit	BRF
Hybrid paper	NMC	Accepted by NIMs, proofs received	
7 alpha	PMS	Complete draft by Nov	WDMR
7 alpha run	MF	Paper on ^{8}Be+^{8}Be states submitted	
LBL ^{16}O+^{8}Be	JSP	Thesis complete, paper by end Dec	
High resolution	NC	Submitted to PRC Oct	BRF
LBL ^{16}O+^{12}C	JTM	Draft circulating	BRF
Leddy detector	MJL	In preparation for NIMs	BRF
Band termination	SPF	Not to be pursued	
Spin low E	CDJ	Merge with previous?	CDJ
Yield 0_3^+	SPC	Draft circulating	DLW

(b) *ANU Annual Report Contributions:*

It was agreed to relay all contributions through DLW via e-mail. Text would be retyped in Canberra. Diagrams should be provided in postscript. A report of each experiment should be provided. DLW to coordinate. $\boxed{\text{DLW}}$

(c) *ANU Charissa Liaison Officer:*

Paddy Regan will not be replaced after he leaves to go to Surrey. G. Dracoulis will send numbers for all accommodation contacts.

(d) *Data Base of Spectra and Diagrams on the Fileserver:*

MF suggested that such a facility should exist. A catalog file should be included, as well as postscript versions and where appropriate the raw data in (x, y) or (x, y, e) form. This plan was endorsed and MF agreed to implement it. $\boxed{\text{MF}}$

(e) *General Summary Document:*

BRF offered to produce a general document describing aspects of the Charissa program and its management, for use as required. This was agreed to be useful. $\boxed{\text{BRF}}$

15. **Date of Next Meeting:**

Charissa Physics Meeting,

To be attended by all staff and students

9.30 a.m., Wednesday, 30 November 1994

Daresbury Laboratory

$\boxed{\text{BRF}}$

W.N. Catford, Secretary. October 4, 1994 (released October 11, 1994)

CH/DOC/94/12

Equipment at the ANU

Inventory after July '94 Running

Author: R.P. Ward

Date: 21 Sep 1994

ANU Equipment Inventory, July 1994

Mounted Targets

Material	Thickness [μg cm^{-2}]	Number	Remarks
^{12}C	100	1	
^{12}C	200	2	
^{12}C	450	2	
^{12}C	300	4	
^{12}C	180	3	
SiO_2	50	3	
Flash gold	5 on 10	2	Very fragile
^{197}Au	125	2	

Unmounted Target Material

Material	Thickness [μg cm^{-2}]	Area [cm^2]	Remarks
^{12}C	10	60	
SiO_2	50	72	
Flash gold	5 on 10	24	
^{197}Au	125	6	

Exabytes

32 × 112m unused. We also have a large number of spare copies, which I suggest we start recycling (or ship home for recycling, if people want to write data to new tapes).

Anode Grids

7 × 100 μm (1 horizontal, 6 vertical).
2 × 20 μm (1 horizontal, 1 vertical).
5 × 20 μm (all horizontal).

Shield Grids

2 $\times$ frames.
3 $\times$ 20 μm.
2 $\times$ 100 μm.

Windows

8 $\times$ 3.5 μm (1 used).

Detectors

9 Hammamatsu detectors (numbers 4, 5, 6, 9, 10, 12, 13, 14 and 15. Number 15 has 3 strips missing; the others have no strips missing). 3 new and 10 used Micron detectors.

Shipping

We have been shipping equipment to the ANU for temporary use via *Local Port Practice* at Manchester. However, when the return shipment came to Customs at Birmingham ,it was delayed for three weeks. I thus sugggest that we ensure that outward and return shipping is always done via Manchester in future.