Minutes

Charissa Group Meeting

Meeting held on: 29 April 1992

Meeting held at: Daresbury Laboratory

Present:	BRF(Chair),WNC,NMC,PVD,GJG,RAH,JSL,WDMR
Apologies:	G. Tungate, D.L. Watson
Distribution:	Those present, plus GT and DLW and file copies to BRF, WNC.

Minutes

0. **Minutes of Meeting of 4 March 1992:** Accepted as a true record.
   Matters Arising:

   - Minutes of Charissa group meetings will be prepared and distributed by WNC in consultation with BRF, and will carry the Charissa logo.
   - An extra item was added to the agenda for the present meeting, to appear as item 5: Electronics.

1. **Update on NSC/SERC matters:** We can expect no formal communications until around August. It is expected that guidelines on manpower may be included with the grant announcements, and that the procedures for committing Charissa grant money are likely to be formalised with a project scientist, etc., as for Eurogam and other projects. Formal minutes of regular collaboration meetings are likely to be required by the NSC. A subgroup of the NSC will be considering requests for equipment and electronics that will become available upon the closure of the NSF.

2. **Report on Run at Lawrence Berkeley Laboratory:** This experiment employed the $^{12}C(^{20}Ne,^{24}Mg)^{8}Be(^{16}O)$ reaction with a 160 MeV ^{20}Ne beam. The run was generally very successful, with plenty of data on tape. BRF has sent thank you letters to Claude Leinus (Director) and Bill Rathbun. NMC has written to Bob Stokstad, Yuendat Chan, Dick McDonald and Jeff Beeman (ultrasonic bonding). BRF reported that the LBL people were receptive to further Charissa running. WDMR commented that the ^{20}Ne beam was likely

to be important for physics reasons due to ^{16}O–α structure. Return of equipment to UK: BRF had spoken to shippers on 27 April regarding immediate dispatch; expect arrival 5 May 92 approx.

3. **Progress Report on Scintillator Detectors:** NMC reported, with reference to the document circulated at the 4 March meeting (CH/Tech/92/02). Orders for test items have been placed with Bicron and with Quartz and Silice (John Caunt). Delivery is expected by end of May in each case. The Bicron product uses a standard low-gain preamp and the PCB requires some modification. The Q& S product will have a new prototype preamp with higher gain suitable for heavy ions. Q& S also advised against adding any length of cable between photodiode and preamp. WDMR reported that preamplifier gains and required shaping times for best resolution needed to be known for design work on new amplifiers. It was agreed that main-amp gains of 50–200 and shaping times of $2\mu s$ would be required. NMC will forward a report to WNC for circulation and filing.

   Beam tests in June/July will be necessary if orders are to be placed in July. BRF summarized that this work was on-track for the spend.

4. **Progress Report on Silicon Detectors:** BRF reported, with reference to the document circulated with the agenda (CH/Tech/92/01). Letters outlining requirements for 50×50 mm^2 PSD's had been sent, and replies received, from 5 suppliers: Q-Par Angus (delivery of 2 prototypes imminent), Micron (loan of NASA design with strips and precision resistors), Canberra (sample of PAD detector requested for assessment), Hamamatsu (RIKEN-type device ordered, for tests in May), Intertechnique (loan of Italian design arranged). A report on detectors of the NASA type appears in NIM A270 (1988) 157-177.

   Beam tests in next month or so are desirable. The strip design needs to be assessed relative to the sheet resistance design. WDMR recommended that tests of each type of detector should use gated integrators and investigate best shaping times and gating lengths for best resolution for both position and energy. JSL reported that the gated integrators used for Eurogam should be available for loan, for these tests. BRF summarized possible breakdowns of the spend before the cutoff date of end Sep (mid-Aug in universities).

5. **Electronics Development:** RAH circulated a preliminary document at the meeting (CH/Tech/92/04). (RAH will send a condensed version to WNC for circulation and filing.)

   An alternative to the present Lecroy-4300 based ADC system was presented. It would use the charge-to-time chip from the 4300, i.e. Lecroy MQT200F or equivalent, mounted in the amplifiers. Effectively, the ECM logic would then move forward to the amplifiers, where a strobe would be required to enable conversion. The outputs would be fed to Lecroy 2277 32-channel TDC's which would record both the event time (rising edge) and energy (time to falling edge) in the same channel. A single CAMAC module can thus take 32 channels of energy *and* time at around £100 per channel. Extra 2277's could be used as pattern registers, providing pileup say, labelled with time of event. Output words from TDC's in this scheme have no particular ordering imposed. FERA links will accept either an ordered event via CAMAC or randomly organised events from TDC groups. An array of event processor modules orders the events (and can do simple front-end arithmetic such as energy calculation) and is connected via VME to the GEC emulator, exabyte drive, etc. A GEC emulator and VME crate will be required at Oxford for development work.

Detailed layouts of the data acquisition electronics were presented by RAH. RAH and WDMR reported that a preliminary costing was £105K for 512 channels, plus £50K for amplifier modifications. The improved system thus compares favourably with previous cost estimates.

BRF obtained a copy of the spend requirements in the cases where final decisions could now be made. This amounted to approximately £100K.

6. **Progress Report on Gas Detector Assemblies:** (discussed at meeting after item 8) PVD presented a conceptual CAD sketch by Stuart Metcalf, showing a 3×3 arrangement of square 5×5 cm^2 detectors on 6×6 cm PCB's. The back plate of the module would provide gas containment and also act, in the case of a plug-in minichamber arrangement, as a sealing plate. NMC indicated that the CsI scintillator would have a total depth of $\approx$40 mm. The number of feedthroughs on the back plate was discussed. WDMR mentioned that some experiments may require the running of strip detectors in such a mount, but without gas.

7. **Progress Report on Chamber and Gas System:** DLW will visit DL in week beginning 4 May to discuss with PVD the gas handling designed for SUSAN and assess its suitability for the new array.

8. **Report on Hybrid Detector Tests:** PVD reported the results of beam tests performed this month using a 90 MeV ^{12}C beam and a gold target. Two hybrids were built; one tested. The detector was mounted at 30° to the beam, and operated at 50 torr of isobutane with a 2.5μm Al-mylar window and 250V bias (5V/torr). The strips faced the beam and were grounded at each end through 500Ω, and the back was biased through 25MΩ. Resolution on PSD energy was 1% with 2μs shaping.

   Vacuum mods following trouble during the run were in hand. WDMR recommended 100K resistors to earth ends of strips, with 500Ω used to provide position offsets. Mods to the distribution boxes for inside the vacuum are required (to be done in Birmingham (NMC volunteered)). PVD described a scheme for coupling interleaved pairs of strips to reduce the number of preamp connections, which could be used on the ^{12}C beam + ^{24}Mg experiment.

9. **Plans for Next Runs:** Proposal 839 (WNC: ^{12}C beam + ^{24}Mg) has been requested for the last two scheduling periods but has not yet been scheduled.

A request is in, asking for next time. Proposal xxx (DLW: Band termination at higher energy) will also be requested next time.

10. **New Proposals:** These are due on 5 June, for the Panel meeting of 6 July. BRF suggested a high resolution run with detectors further back, and reported that DLW was considering an angular distribution run. Any submissions should be circulated around the group before sending to the program panel, where possible.

11. **Any Other Business:** BRF will write to Micron Semiconductor about the problems with ultrasonic bonding on the strip detectors, as recently experienced in Berkeley.

    Strip detectors at Daresbury should be inspected, and their use in experiments should be tested in more detail with beam tests this summer — BRF will organise a team.

    WDMR summarised that he needs to be advised of shaping times, gated integrator times and amplifier gains as required for all detectors.

    The weekend workshop tentatively planned for Strasbourg in early June has been cancelled because liaison is already being maintained satisfactorily at this stage.

    WDMR reported that the analysis of the 7–α data was proceeding well (P. Simmons). Resolution of 65 keV was achieved for $^{12}C^{*}$ for 3–α.

    Written reports should be sent to WNC – ideally as LaTeX files, or at least text files, over e-mail.

    A Charissa *Physics Meeting* was arranged for 8 July in Birmingham, beginning at 10.30 am.

12. **Date of Next Meeting:** 11.00 am, *Thursday* 11 June 1992 *, in Oxford. Assemble in Common Room, level 5.

W.N. Catford, Secretary.
May 5, 1992
(released May 8, 1992)

* *Please note* that this is one day later than originally planned; confirmation of starting time still pending.