CH/DOC/92/07

Agreement

Charissa at the ANU

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Date: 21 Sep 1991

Charissa at the Australian National University

In this document we outline our plans for bringing the Charissa array to ANU. Because of the fluid state of Nuclear Physics in the UK and the current Sterling crisis this paper can only give an indication of our plans and they may have to be changed. But we will try to stick to the following timetable as best we can.

This document is laid out sequentially starting after the visit of Bill Rae to Canberra in September 1992.

1. Paddy Regan is coming to work at ANU in November 1992. He has agreed to liaise with the Charissa group for a period of about 6 months initially. Paddy will have an initial meeting with the Charissa group during October before he travels to Canberra.

2. Around late December 1992 a second person will come to ANU to follow up on Bill Rae's visit. This may be Brian Fulton. He will hopefully be able to consolidate some of the details.

3. The NSF closes finally at the end of March 1993. We have an ongoing program at Berkeley and we have already made plans to go to Berkeley in April 1993. Once these experiments are complete we will be able to start shipping equipment to Canberra.

4. About this time — late April or early May 1993 — we hope that and RA (Postdoc) and a Graduate Student will come over to ANU for a period of about 6 months. They will come over to gain familiarity with the laboratory here and running the Tandem accelerator. They will collaborate with the groups using the scattering chamber. They will also begin to start work on the 2m scattering chamber in preparation for the Hybrid Charissa detectors.

   The Hybrid detectors have a gas ΔE detector (isobutane) and 5cm $\times$ 5cm Si detectors. Sometimes the Si detectors will be used alone. Each of these detectors requires 32 cables. We need to run at least two. We would like to run 4 which will need 144 cables into the control room (this includes extras for HV, pulsers etc) . The cables inside the chamber must be teflon coated.

There is some concern that there may not be adequate room in the cable duct for this number of cables. ANU will evaluate this and inform the Charissa group. Meanwhile the Charissa group will look into the possibility of using thinner coax cables or coax-strip cables which are now available.

We will need a gas handling system for the hybrid detectors. We assume that ANU can provide a gas handling system for ionisation detectors for a period of a week before a run until the end of that run.

The cables would come out the base of the chamber using small cohnex (Sealectro) feedthroughs with VITON 'O'–rings. We anticipate no problem in getting over 128 feedthroughs on the base if we use all four ports. This has been discussed with Jack Leigh at Canberra and he is happy with this proposal. We would use the push on variety and mount these in groups of 16 or 32 on plates. This will enable 16 or 32 connections to be made simultaneously by building male/female plates; cf. current Charissa detector blocks. No labels will be allowed on cables (which may outgas). The blocks should be inscribed with cable numbers.

We would supply all feedthroughs, cable etc. We would hope to get the cables terminated with appropriate connectors in the UK and all the feedthroughs already attatched to appropriate ports. The RA and student would fit these to the 2m chamber with appropriate supervision. We would run the cables to the control room using the existing supports and ducts. This job will require quite a lot of access to the target room and chamber and more detailed plans will have to be presented indicating how much time will be required and when it will be most convenient to do this job.

The chamber is isolated. The feedthrough port holes are isolated from the chamber. The detectors must also be isolated from the arms and gas connections also must be isolated. The material preferred at ANU is MACOR ceramic although teflon would do.

We will need more accurate figures on the lengths of the cables needed both inside the chamber and from the base of the chamber to a patch pannel. From there on standard BNC's to the Control room. We will supply insulating panels with BNC's attached. The distance from the chamber to control room is about 50m. The dimensions inside the chamber will initially be estimated from the drawings of the chamber.

In the control room it would seem most appropriate for the Charissa electronics racks to be placed either side of the rack presently containing the patch panels for cables from the target room. There seems to be ample space here which would not interfere with other users.

Another power circuit will be required in this area as well as a table for the data acquisition computers, disks and tape drives. These will be supplied by ANU.

5. Some time later in the winter (Canberra winter — UK summer) other physicists and technical staff will come over to set up the Charissa electronics and

data acquisition systems and to check mounts for the detectors in the 2m chamber. Again we would machine the mounts in the UK but final fitting may require some machine shop effort at ANU. We would anticipate doing this in June/July. We shall either bring racks for the electronics or order them here. (See later about local ordering).

We shall be coming with a complete data acquisition system including CAMAC crates and ADC's, VME crate, interfaces, Exabyte tape drives, SCSI disks and one or more Sun workstations. We understand that these work stations can be put on the Internet. However we shall have no backup system. Bill Rae has ascertained that we could use the Canberra data acquisition system as a back up. We are already familiar with the Starburst controller and intend to use this initially in the Charissa-II array. It would appear that the only major changes to code for 128 channels would be to the acquisition process in the Starburst. Exactly how this is to be achieved has yet to be decided. ANU will advise us in due course.

We would have to buy several interface modules and have an optical decoupler built. A quote for building an optical decoupler in Central School Electronics at ANU has been requested. We will pay this and purchase all the necessary interfaces for making up a data acquisition station.

Thus we would provide a completely new third data acquisition system of the Canberra design. We would not anticipate purchasing a VAX initially and would hope that one could be provided by ANU if this was ever necessary — i.e. to use the Canberra system as a backup.

If the stand-alone SUN based data aqusition system is delayed by unforseen problems in the UK we will have to reconsider the above plans. It might then be wise for us to consider buying a MicroVAX workstation. But we would still like to use Exabytes rather than DAT tapes if this were possible.

6. Assuming all the above have been completed succesfully we would plan to ask for some beam time in September 1993. We anticipate asking for about two weeks of time for two experiments. One would require a ^{24}Mg beam and ^{12}C and ^{24}Mg targets. We hope that these plus Au targets would be provided by ANU. The other experiment would require a ^{16}O beam and ^{12}C targets.

   The energies required are up to 160/180 MeV for ^{24}Mg and up to 110 MeV for ^{16}O. The beam currents we would hope to get are about 50ena for ^{24}Mg and somewhat more for ^{16}O.

7. Assuming all the above is succesful all of the British contingent (including the RA and student who should have arrived in April) will return to the UK. We would anticipate coming over again near Easter 1994 for further experiments — possibly about two weeks again. Beyond this our plans are rather less certain but the Easter/ September scenario might become more routine.

8. Other arrangements:

   (a) The Charissa group will explore the possibility of providing a complete beamline including supports, beam tubes, pumps, diagnostic box, quadrupoles, power supplies, chamber and pumps, and a faraday cup. We would hope that this would be set up in the new LINAC target room at ANU. We would hope that beam from the Tandem could be used on this line before the LINAC itself is complete. ANU will indicate when they might hope to have this beam line ready assuming the parts are available just after April 1993.

       The Charissa group and ANU also need to explore how and when this beam line should be shipped and who might pay for the shipping costs. If possible it would be sensible to ship this beam line out with the inflection magnet due to be shipped out around June 1993. David Weisser will be in the UK in November 1992 at which time we should advise him of the details of what is available.

   (b) We are currently designing and building the Charissa-II array. This will be completed sometime in 1994. Part of the new array is a transportable scattering chamber and associated equipment (such as gas-handling). For Charissa-II we will have almost all the electronics in the target room with only the computer and Exabyte drives in the control room. Thus there will be a need for space for racks around the Charissa-II chamber. We cannot give details of the number of racks at this time. Also it is still not clear where Charissa-II will be set up initially. However since the whole system is designed to be portable it is not at all unlikely that this new array will spend some time at Canberra on the end of a beamline (such as that discussed above) in the LINAC target area.

   (c) We hope that ANU will be able to set up a local account which we can use to purchase consumables and other small items of equipment in Australia. We could either run this account in credit or debit with payments being made from the UK monthly. We would hope to have an unbarred telephone for calls to the UK and elsewhere. This should be billed to the above account.

   (d) All the UK visitors will need letters of invitation in order to get the appropriate visas for multiple entry into Australia. ANU will need to supply these letters to most individuals from the UK who come over. (Academics and students will be made Visiting Fellows; CV's will be required. Technical/ support staff may be on a different arrangement.)

   (e) We would hope to set up some scheme whereby we might be able to employ someone working at ANU on the Charissa program full time. Brian Fulton and George Dracoulis will explore the possibilties.

   (f) People from the UK will hope to have housing arranged initially by the liaison person (Paddy Regan). The visit in December 1992 will be used to provide specific dates and the type of accomodation required. At this time we will arrange car hire, if necessary, or bicycles if more appropriate.

(g) We hope that ANU can provide office space for members of the Charissa group. We would like to have an Ethernet connection in this office if possible.

(h) We also hope that ANU would be able to make targets for the Charissa experiments. The Charissa group will pay for all isotopes and consumables required.

(i) The academics from the UK involved in Charissa are:

Brian Fulton	(Chairman/Spokesman)	Birmingham	bw@np.ph.bham.ac.uk
Bill Rae	(Physicist/Spokesman)	Oxford	rae@v1.ph.ox.ac.uk
Wilton Catford	(Physicist/Secretary)	Surrey	catford@nnga.dl.ac.uk
Doug Watson	(Physicist)	York	oe@phga.york.ac.uk
Nobby Clarke	(Physicist)	Birmingham	nmc@np.ph.bham.ac.uk
Garry Tungate	(Physicist)	Birmingham	gt@np.ph.bham.ac.uk
John Lilley	(Physicist)	Daresbury	bj@nnga.dl.ac.uk

(j) The RA's involved in Charissa at present are:

A.N. Another	(physicist/programmer)	Birmingham	
A.N. Another	(physicist)	Birmingham	
Alan Merchant	(theoretical physicist)	Oxford	merchant@v1.ph.ox.ac.uk
Chris Jones	(physicist)	York	oem@phga.york.ac.uk
Godfrey Gyapong	(physicist)	Surrey	phs1gg@ph.surrey.ac.uk

(k) The key technical staff building Charissa-II are:

Dick Hunt	(digital electronic/data acquisition)	Oxford
Barney Brookes	(analogue electronics)	Oxford
Patrick Coleman-Smith	(electronics)	Daresbury
Bob Cunningham	(support physicist)	Daresbury
Jim Kay	(engineer)	Daresbury
Vic Pucknell	(computing)	Daresbury

(l) The current Graduate Students are:

Peter Simmons	Oxford	(2nd Year)
Mike Leddy	Birmingham	(3rd Year)
Alex Murphy	Birmingham	(2nd Year)
Jo Pople	Birmingham	(2nd Year)
A. N. Other	Birmingham	(1st Year)
A. N. Other	Birmingham	(1st Year)
Simon Fox	York	(2nd Year)
A. N. Other	York	(1st Year)
Steven Singer	Surrey	(1st Year)

This paper has been discussed with George Dracoulis, Trevor Ophel and David Weisser at ANU and they are happy with the proposed arrangements. The UK group understand that ANU staff will be fully occupied with the LINAC project for the next 18 months and, while they will make every effort to help the Charissa group, this may not always be easy or possible.

Signed on behalf of Charissa collaboration by

William Rae

21st September 1992