

Dr. P. Bowler.

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September 13th, 1960

NI/GP/60/43

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

GENERAL PURPOSES COMMITTEE

Development of Cerenkov Chambers at Southampton
University for use with Nimrod.

Covering note by the Secretary

In the attached paper Dr. Pickavance recommends an extra-mural research agreement with Southampton University under which Cerenkov chambers and associated digital recording equipment would be developed in Professor Hutchinson's department at Southampton for use with Nimrod. The initial commitment for which approval is required is £13,000, and G.P.C. approval is therefore required.

In addition to Dr. Pickavance's recommendation, the paper has been referred to the Chairman of the Visiting Committee, Sir Harrie Massey, who has endorsed it on behalf of the Visiting Committee.

Approval is urgently required, so that the two physicists may be recruited. I shall therefore be very grateful if members will kindly let me know by correspondence whether they approve.

J. A. V. Willis
Secretary,
Rutherford High Energy Laboratory,
Harwell.

Circulation - to Members of the G.P.C. for action
- to Members of the Governing Board for information.

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NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

GENERAL PURPOSES COMMITTEE

The Development of Cerenkov Chambers for the Display of
Particle Trajectories and of Associated Apparatus for
the Digital Recording of Visual Displays.

Note by T. G. Pickavance

1. Professor G. W. Hutchinson has proposed that the Institute should support an investigation to be carried out at the University of Southampton leading to the construction of a gas-filled Cerenkov Chamber for use with Nimrod. The research falls into two parts which although closely linked may have separate and wider uses.
2. It is proposed to carry out a design study of optical systems suitable for transmitting Cerenkov light from a radiating medium, the object being to get the maximum definition of direction and velocities of charged particles traversing or produced in the medium. Image intensifying tubes of a type recently developed at the Imperial College of Science and Technology will be used for this purposes. (Such tubes are also being used in an Institute-sponsored investigation at Imperial College on Scintillation Chambers and it is anticipated that mutual benefit would accrue to the two Groups through this common interest). This work would be followed by the design and construction of a Cerenkov Chamber using a pressurised hydrocarbon vapour as radiator, and incorporating one image intensifying tube.
3. In parallel with this work, development would be carried out on the use of television camera tubes and scanning techniques to convert visual representations of particle tracks into digital form, suitable for feeding to digital computers for analysis.
4. To carry out the investigation it is proposed to recruit two scientists of research fellow standing, each to be responsible for one of the two parts of the project described above. One technical assistant would also be needed. It is expected that additional staff (one or more post-graduate research students), will be needed after the first year. The present initial proposal would cover a period of two years beginning October, 1960.
5. The cost of the investigation to be covered by an Agreement with the University is estimated to be as follows:-

	<u>1st year</u>	<u>2nd year</u>
Staff salaries	£2,500	£3,000
Travel	200	200
Expendable stores	600	600
Capital equipment:-	1,000	-
Chamber, compressor, chemicals and refractometer etc.		
Optical parts and cameras	300	100
Image and photo-multipliers, and T.V. camera tubes	1,000	1,000
Associated electronics and test equipment	2,500	-
Total	£7,100	£4,900
		<u>£ 13,000</u>

6. If the early work proves successful a more extensive project is envisaged for the construction of Cerenkov Chambers containing more than one image intensifying tube. Any such proposal will be considered in the light of

the potential benefit not only to the Southampton team, but to other university groups using Nimrod, and if recommended, will be referred back to the Committee for the approval of the additional expenditure involved.

7. I considered that work on Cerenkov Chambers and associated equipment is highly desirable and recommend this proposal for an initial programme of research at a cost not exceeding £13,000, for approval by the Committee.

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