

9th November, 1960

Mr P. Bowler C-13.

NI/GP/60/46

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

GENERAL PURPOSES COMMITTEE

Development of Spark Chambers for use with Nimrod

Covering note by the Secretary

In the attached paper, Dr. Pickavance requests the Committee's approval for development at University College, London of spark chambers for use with Nimrod, at a cost not exceeding £16,800.

Since it is hoped to start this work in January, I shall be grateful if members will take the request by correspondence, and will let me know whether they approve. As usual, if there are no objections, I will ask the Chairman whether he will give approval on behalf of the Committee.

30th November, 1960

NI/GP/60/46

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCE

GENERAL PURPOSES COMMITTEE

Development of Spark Chambers for use with Nimrod

1. A spark chamber is a vessel filled with a suitable pure gas and containing a number of parallel plates across which a pulse of high voltage may be rapidly applied. When high energy charged particles pass through the chamber, their tracks are shown up by sparks between the plates, and these can be photographed from two directions at right angles. Advantages of the device are simplicity of operation, and the opportunity to introduce large amounts of matter for the particles to interact with by using thick plates of suitably chosen material. Polarisation of the particles can be detected because when polarised particles interact with matter they are scattered preferentially in one direction. High energy neutral particles can be detected owing to their interactions with the material of the plates.

2. Sir Harrie Massey has proposed that the Institute should support an investigation to be carried out at University College London involving the construction of and trial experiments with spark chambers. The object of the investigation would be to develop a technique for analysing the polarisation of high energy recoil protons which can be used with beams from NIMROD. The programme would last for two years from January 1961 to December 1962. It is expected that a separate proposal would then be made for Nimrod experiments.

The present proposed programme may be divided into three phases:

1. Development of Spark Chambers

To be carried out at U.C.L.

2. Calibration of the Chambers

This could be done with a polarised proton beam from the Birmingham proton synchrotron. It is anticipated that three months might be spent at Birmingham.

3. Trial Experiment at CERN

This would be a worthwhile experiment in its own right and will also serve to establish techniques that could be applied with NIMROD. It is anticipated that three months would be spent at CERN. The DSIR have indicated that they would have no objection to the Institute sponsoring such research at CERN on the understanding that the experience gained would ultimately be of use with NIMROD.

3. The cost of the investigation to be covered by an Agreement with the College is estimated to be as follows:-

a) Staff Salaries

Research Assistant £900 x £50 - £950	£1,850		
F.S.S.U. 10%	184		
National Insurance £22 p.a.	<u>66</u>	£2,000	
Two technicians £825 x £25 - £850	3,350		
Superannuation at 6%	200		
National Insurance £22 p.a.	<u>130</u>	<u>3,680</u>	£5,680

b) Travel and Subsistence (excluding visits to Harwell)

Phase 1		450	
Phase 2		400	
Phase 3		1,900	
Insurance of staff while working outside U.C.L.	50	<u>50</u>	£2,800

c) Transport and Insurance of Equipment

Phase 2	£25		
Phase 3	Transport £150		
	Insurance <u>50</u>		225

d) Equipment

Chamber (substantially two chambers)	£1,100		
Modulator and High Voltage supply (two)	750		
Camera and Optics (one final and one very simple)	300		
Film	500		
Gases	500		
Associated Counter systems	2,000		
Hydrogen target	500		
Mechanical auxillaries	<u>1,000</u>	£6,550	

e) Overheads and Administration

		£1,500	
Total (for two years)		<u>£16,755</u>	

4. I consider that the work on spark chambers ultimately intended for use with Nimrod is highly desirable. The technical details of the present proposal have been fully discussed with Professor Massey and his staff, and I recommend the approval of this programme at a cost not exceeding £16,800.

T. G. Pickavance