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PHYSICAL RESEARCH LABORATORY
SHAHIBAG, AHMEDABAD.

2nd March '48

Sir,

I wish to apply for the Imperial Chemical Ind. Research Fellowship ( National Institute of Sciences). We are required to send in recent testimonials.

Dr Sarabhai suggested that I should approach you and Dr Ramnathan for the same. Dr Ramnathan is expected here shortly and he has an intimate knowledge of my work. Since I had no opportunity of discussing the progress of my work with you after I left Allahabad I am giving the following information which will enable you to ascertain the nature and scope of my work.

In 1944 I passed my M.Sc, narrowly missing a first class but secured the highest marks in practicals.

In June 1945 when Dr Tosniwal was about to leave Allahabad you were kind enough to recommend me to Dr Sarabhai. By then I had worked with Dr Tosniwal for one year in the B.I.R. Scheme for the manufacture of Radio sets.

On joining I took charge of this laboratory and gained experience in Cosmic Ray technique. In the absence of Dr Sarabhai I worked for about two years at the Weather office, Poona. In September 1945 I got registered for Ph.D. under Dr Ramdas. Now I have completed the two years necessary for the submission of the thesis.

The problem before me was - the verification and elucidation of the positive correlation between the Semi-diurnal variation of Meson Intensity and barometric pressure. This effect was observed independently by Sarabhai and Regener and Rau. Dr Sarabhai proposed a theory for the effect in terms of Pekeris' theory of the (12 hr period) atmospheric oscillations. For these free oscillation the atmosphere has a nodal surface at 30 Km above and below - which the

pressure varies in phase opposition. Due to this ~~the~~ increase of pressure near ground corresponds to a decrease in pressure above 30 km and consequently a reduction in the height of the isobaric level at which mesons are generated. The decrease in the probability of decay ~~decr~~ due to the shorter path results in increased intensity.

For this work I developed a technique for making argon-ether filled Geiger Counters (Self-quenching). I succeeded in making as good counters as have been reported by others. I gave several runs at Poona to a vertically directed cosmic ray telescope set for continuous registration of meson intensity. The positive correlation was repeatedly observed but at the same time the difficulties also became evident.

I found that the self-quenched counters filled with organic vapours for quenching were not suitable for long duration experiments on cosmic rays.

I have devoted full one year to the development of a fast externally quenched Geiger counter filled with permanent gases only. The sluggishness of the older externally counters was due to the large time constants which had to be employed in the quenching circuits (Neher-Harper & Pickering). A new quenching circuit has now been evolved by us which makes the externally quenched counter as fast as the self-quenched counters. This makes it suitable for coincidence work and ideally suitable for long experiments as there is no dissociation going on inside the counter.

Dr Vallarta was here for four days. He was satisfied with our technique for long experiments and made valuable suggestions regarding the disentangling of sideral and heliomagnetic effects from our continuous record.

The main difficulty in our work is the unusually long time required before the data can be analysed to give reliable results. Since these effects cause about 0.5% change in the intensity the experiments have to be run for

about 300 days before the statistical error becomes negligible.

The large telescope which we are building now will continuously record the shower, soft meson and hard meson intensity and will not only verify the positive correlation but will give valuable information about sidereal and helio-magnetic diurnal variations. Some light can also be thrown on the height of the meson producing layer.

I have already spent four years in Research after my M.Sc. Financially I am much worse off than my class-fellows who joined the A.I.R. and I.M.D. My present salary is only Rs 170/= p.m. after 3 years' service. Since the work will probably take much more than one year before I can submit my thesis financial aid by way of this Fellowship will be a source of encouragement and strength. My responsibilities towards the family are making my stay difficult here (with this salary) but to give up the work after setting up the whole laboratory and making the necessary preparation for getting started would also be a great mistake.

You will be glad to learn that the Laboratory is exceptionally well equipped for the type of work which we are doing. We hope to get much better results after Dr Ramanathan comes to Ahmedabad.

I am sorry for so much encroachment on your time but there was no way out but to give the whole story before making a request for a testimonial.

I hope it will be possible for you to kindly send me testimonial so that I can send my application to Delhi before 15th inst.

With respectful regards

Yours respectfully
C.P. Joshi.