

15th February 1962.

To: The Nuclear Physics Research Committee.
From: P. G. Murphy and J. C. Sens.
Re: Proposal for an experiment on the β -decay of the Λ particle.

The experimental observation of the decay of the neutron, the asymmetries of neutrino and electron with respect to the neutron-spin, and the angular correlation between the neutrino and electron momentum, forms at present one of the cornerstones of the theory of weak interactions. The experimental result agrees with no other combination of S, V, T, and A than V-A, and with lefthanded neutrinos.

It is obvious that for the strangeness changing weak interactions, equally valuable information can be obtained by a study of the same parameters in the β -decay of the Λ .

Experimentally, not only is the branching ratio very small but also kinematically this process looks very much like the more frequent non-leptonic decay modes.

In the accompanying text we discuss a spark chamber method for obtaining the desired information without triggering the chambers excessively often on the more frequent decay modes. It incorporates a spark chamber, whose plates form the elements of a scintillator shower detector, so that the shower initiated by the electron is only photographed when it is known beforehand to be there.

From the theoretical point of view, surprises are to be expected, since, for example, the branching ratio for this process does not fit a simple V-A picture at present. The theory on this point is sufficiently dubious and could well do with data like the parameters we propose to measure here.

The equipment will naturally need testing, but, once operating our rate estimates lead to about three days of data-taking.