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A PRECISION DETERMINATION OF THE β - PARAMETER OF Λ^0 DECAY

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INTRODUCTION

A proposal for the measurement of the β parameter in Λ decay with a precision sufficient to be a relevant test of time reversal invariance in this decay has been put forward.

The spark chamber set-up and optical system developed by the Institut de Physique in Geneva can with minor modifications and additions be used in the experiment. It is also intended to use, in parallel with a conventional camera, a Vidicon system developed by the Lund group.

Considerable experience will be gained with these instruments during summer and early autumn in runs at the synchro-cyclotron as a part of the polarization measurements in proton-neutron scattering by the Geneva-Lund teams.

ORGANIZATION

We have decided to form a mixed experimental team for the proposed experiment at the PS. The group is represented by G. von Dardel. The administration of the CERN section will be taken by M. Reinharz.

The Geneva University section of the team will contribute the spark chamber and carry out most of the necessary modifications.

The Lund team will improve the Vidicon system for the new experiment.

Analysis of the results will be prepared using in parallel conventional photography, scanned manually and analysed with Luciole, and Vidicon recording transferred to magnetic tape. The programmes for this analysis will be developed by a joint programming team.

The CERN team will prepare the counter triggering system, adapt an existing hydrogen target and prepare some new units for the spark chamber set-up.

TIME SCHEDULE

Tests of the counter system at the PS can be carried out in October. The spark chamber polarimeter can be ready at the PS during the latter half of November. We expect to use the time before the shut-down for setting up and for preliminary runs, and to start taking data after the shut-down. These estimates are based on starting preparations within the next month.

As estimated in the previous proposal, 60 shifts will be needed to attain the desired accuracy.

If the new Vidicon system works and the programmes for it are ready, we could have at least a preliminary result very soon after the conclusion of the production run. An analysis of the photographs will require about three months.

COST ESTIMATES

We only need to discuss the part of the cost for the preparations of the experiment which has to be carried by the CERN NP division.

Preparation of hydrogen target :	10,000	SFr.
Counters	: 40,000	"
Spark Chambers	: 20,000	"
Hydrogen Hut	: 10,000	"
Miscellaneous	: 20,000	"
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	100,000	SFr.

STAFF REQUIREMENTS

The number of physicists participating in various phases of the experiment is sufficient. The visiting teams have adequate technical support. However, the CERN team has at present no technician at its disposal. We will need 1 electronics technician for the counter system and adequate technical support for setting up the experiment and for the preparation, testing and operation of the hydrogen target.

We will need one scanning girl by December and 5 more for 6 weeks after the shut-down, if photographic recording is used in the production run.