

526
14 June, 1966

CM-P00053647

Addendum to the ProposalTEST ON MUON NUMBER CONSERVATION

K. Borer*, H.-J. Gerber, B. Hahn, H. Hofer*, F. Krienen

This paper presents some additional information concerning our proposal.

1. $\bar{\nu}$ Background Calculations

The μ^+ background coming from π^- and K^- in the beam (via $\bar{\nu}$ interactions) could not be given in the proposal. Calculations have since been made by A. Asner and Ch. Iselin (Layout of the new CERN Neutrino Beam, CERN Yellow Report, in press) and by W. Venus on the $\bar{\nu}$ contamination in the ν beam for the new focusing devices (Venus horn and 2 additional reflectors). For all energies of interest in our experiment, the contamination is $< 10^{-3}$. Allowing for an uncertainty of a factor 2 on this number and of a factor .5 in the difference of $\bar{\nu}$ to ν cross sections, we expect a μ^+ background from this source of $< 10^{-3}$.

2. Event Rate and Running Time

We have re-computed the event rate and arrive again at 2000 to 3000 events, in 6 weeks' running time, this value being in good agreement with independent event rate calculations by the bubble chamber group for the corresponding events inside the bubble chamber.

Based on the estimated backgrounds, the limit which we will be able to quote for the conservation of the muon number (if it is conserved), is on the level of a few per mille, if expressed in the observed μ^+ , μ^- ratio. In order to make the result statistically as significant as possible, it is necessary to run our experiment during the full 6 weeks period allocated to the bubble chamber.

* University of Fribourg.

3. Time Table for Preparation

In a memorandum (NP/Memo/793, 6 March, 1966) to Professors Preiswerk and Paul, we have presented the attached time-table (Fig. 1). The relatively long time (8 months) is caused by the fact that most of our equipment should be installed and tested before the installation of the bubble chamber takes place and propane tests start.

For a possible begin of the ν experiment in February, 1967, about 7 months are left, and therefore a decision on the experiment becomes very urgent.

4. Remarks on the Budget

The budget includes Fr. 70'000.- for installation costs, safety devices, neon gas, new electronics and cables.

It is hoped that it will be possible to take over many components from the CERN-NIMROD ($K_2^0 \rightarrow 2\pi^0$) experiment, e.g. plastic scintillators, electronics, etc, which in fact also have been used in the old ν experiment. (NP/Memo/799, 8 June, 1966). If the fast electronics would have to be bought, or built, we would have to ask for another Fr. 80'000.-. In this case, the total budget for CERN would be Fr. 150'000.- .

Photographic equipment and some electronics which are offered by the Fribourg University has a value of Fr. 50'000.- .

5. Personnel

The group would consist of the following people :

K. Borer	(mainly electronics)
H.-J. Gerber	(if available from β (Λ))
B. Hahn	(represents group)
H. Hofer	(mainly evaluation)
F. Krienen	(layout and equipment)
and 2 students	(mainly for help during the run).

During 4 months, we would need an electronics technician.

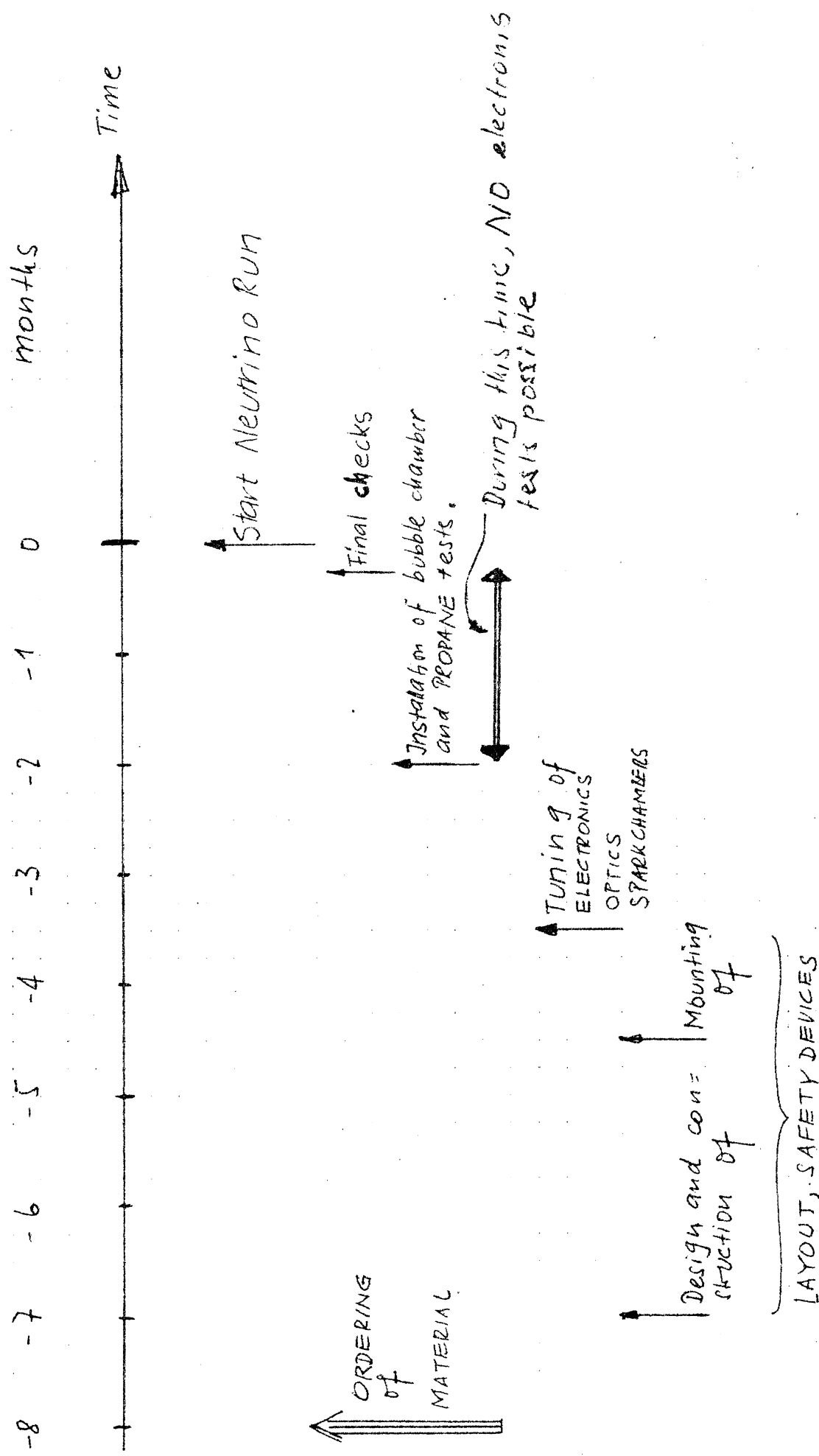


FIG. 1