EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

CERN/ISRC/69-6 Add.
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INTERSECTING STORAGE RINGS COMMITTEE

Addendum

to proposal CERN/ISRC/69-6 for

A DETAILED INVESTIGATION OF LOW-MOMENTUM PARTICLES EMITTED AT LARGE ANGLES FROM pp COLLISIONS AT THE ISR

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1. SUMMARY OF THIS ADDENDUM

As regards the possibility of detecting slow monopoles we have found that relatively simple modifications in our set up and plans will improve the chance of detecting such particles.

A design study carried out in collaboration with E. Fischer et al. of the ISR Department has shown that a vacuum chamber satisfying the minimum requirements of the experiment can be built with methods and components now available and tested. A conceptual design of a relatively simple system to transport emulsion stacks from a shielded region to the exposure position and back again has been made also. This system can be adapted to changing exposure requirements.

An approximate time schedule is given at the end.

2. MONOPOLES

Monopoles are expected to ionize extremely heavily: they should thus be observable in nuclear emulsions and in plastic detectors which are not sensitive to singly charged particles. Because such detectors are much less affected by background radiations than normal nuclear emulsion relatively long exposure times, counted in days rather than in hours, will be possible.

Furthermore, because of the insensitivity of the detectors to singly charged particles and γ radiation, it will be possible tosearch for monopoles also in the forward direction.

We propose to include this search for monopoles in our programme. This will require a second thin window in the vacuum chamber to allow monopoles emitted forward to reach the detectors. This window and its aucillary equipment would otherwise be identical with the one covering the large-angle region.

3. VACUUM CHAMBER WITH THIN WINDOWS

E. Fischer et al. (ISR) have tested aluminium windows. Thus we can expect to get windowswith a diameter of at least 250 mm and 50 μ thick. They found them to be satisfactory for use in the system described below. Such windows, equivalent to 35μ of nuclear emulsion, are acceptable in the experiment. One may hope, of course, that further technical development will result in even thinner windows.

A sketch of the proposed vacuum chamber with thin windows and facilities for transporting the detectors between the shielded region and the exposure position is attached. The following points should be noted:

a) The two thin windows are of the same type and the same apparatus for emulsion handling will fit on either.

b) The windows are used to separate the ultra-high ISR vacuum from a low-grade vacuum in which the detectors are kept.

c) The entire transport system for the detectors is part of the low-grade vacuum system. The airlock is in the shielded region.

d) The transport system is built out of standard beam-transport vacuum pipe in which a self-propelled remotely controlled trolley carries the detectors. Such a system can contain curves and gradients and it can be made in any convenient length.

4. A VERY APPROXIMATE SCHEDULE

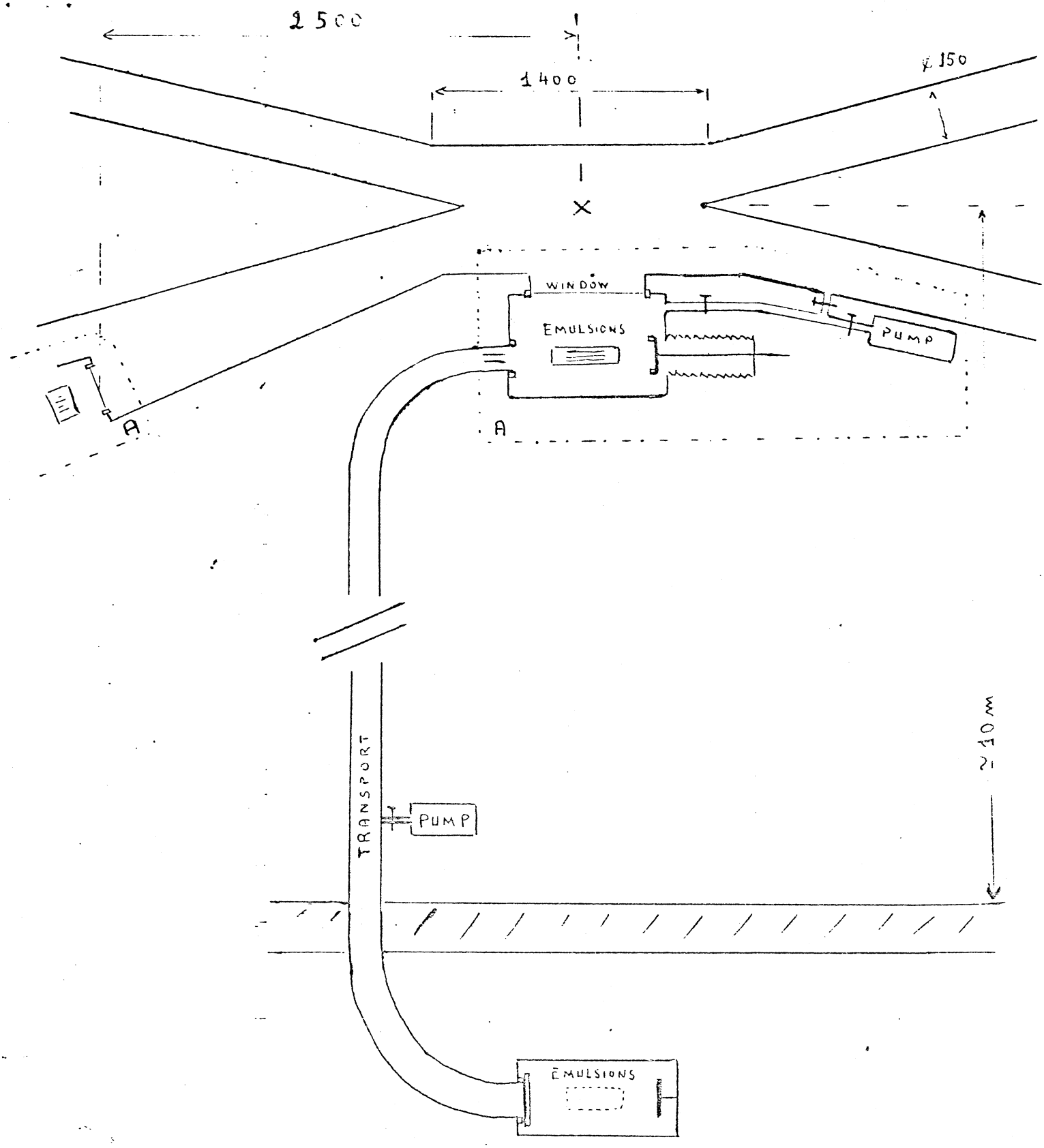
As was stated in the original proposal, preliminary work, including test exposures at the PS, is needed to prepare the experiment and determine what is the minimum intensity of the circulating beam in the ISR. As soon as protons are injected into the ISR, more realistic background studies can be made.

This means that a small group of competent emulsion workers would have to start work by the middle of this year if the first protons will be injected into the ISR in early 1970.

Detail design and construction of the vacuum chamber and transport system would have to start immediately.

On the assumption that full support is given to this experiment one can arrive at the following schedule.

Time	Physics	Engineering
Second half 1969	Background tests at PS. Scanner training. (Training experiment).	Design and construction of vacuum chamber and transport system.
Early 1971	Tests at ISR. Decision on what is acceptable ISR performance.	Delivery of equipment; tests.
Date of first acceptable ISR operation (T_o)	First exposure ($\lesssim$ 1 week).	All equipment now works.
T_o + 3 months	Second series of exposures ($\lesssim$ 1 week).	
Later, when ISR in full operation	Third series of exposures.	



PROPOSAL ISR/69-6 ADD.

EXPERIMENTAL SYSTEM