

ORGANISATION EUROPÉENNE POUR LA RECHERCHE NUCLÉAIRE
CERN EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

ADVISORY COMMITTEE ON VISITING TEAMS

Fifth Meeting
6 October, 1959

DESCRIPTION OF EXPERIMENTS REQUESTED BY VISITING TEAMS (cont'd)

Attached is a description of the experiments which the following Universities and Institutions have requested to perform with the synchro-cyclotron:

wait for polarized beam

Istituto di Fisica, Padova, Italy	Exp. 34 X
Istituto di Fisica dell'Università, Trieste, Italy	Exp. 21
Istituto di Fisica, Bologna, Italy	Exp. 35
University of Fribourg	Exp. 20

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EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

QUESTIONNAIRE CONCERNING PROPOSED EXPERIMENT

WITH THE CERN CYCLOTRON

by : A. Loria

date : 26 September, 1959

Complete address : Istituto di Fisica, Via Marzolo 8,
Padova, Italy

Short title of experiment : Scattering of polarized 382 MeV kinetic
energy protons on protons

Nature and short title of the experiment :

At 382 MeV K.E. a measurement of P given by double scattering is lacking, while a previous determination of $c_{nn}(90)$ exists: it is also hoped to have a sufficient number of triple scattering events as to be able to use them too in phase shift analysis.

As for previous experiments see the review made by G. Puppi in CERN Report 1958, particularly at page 54.

Experimenters' names :	Institutions :
A. Loria	{ Istituto di Fisica dell'Università Via Marzolo 8 - Padova, Italy
R. Santangelo	
G. Zago	

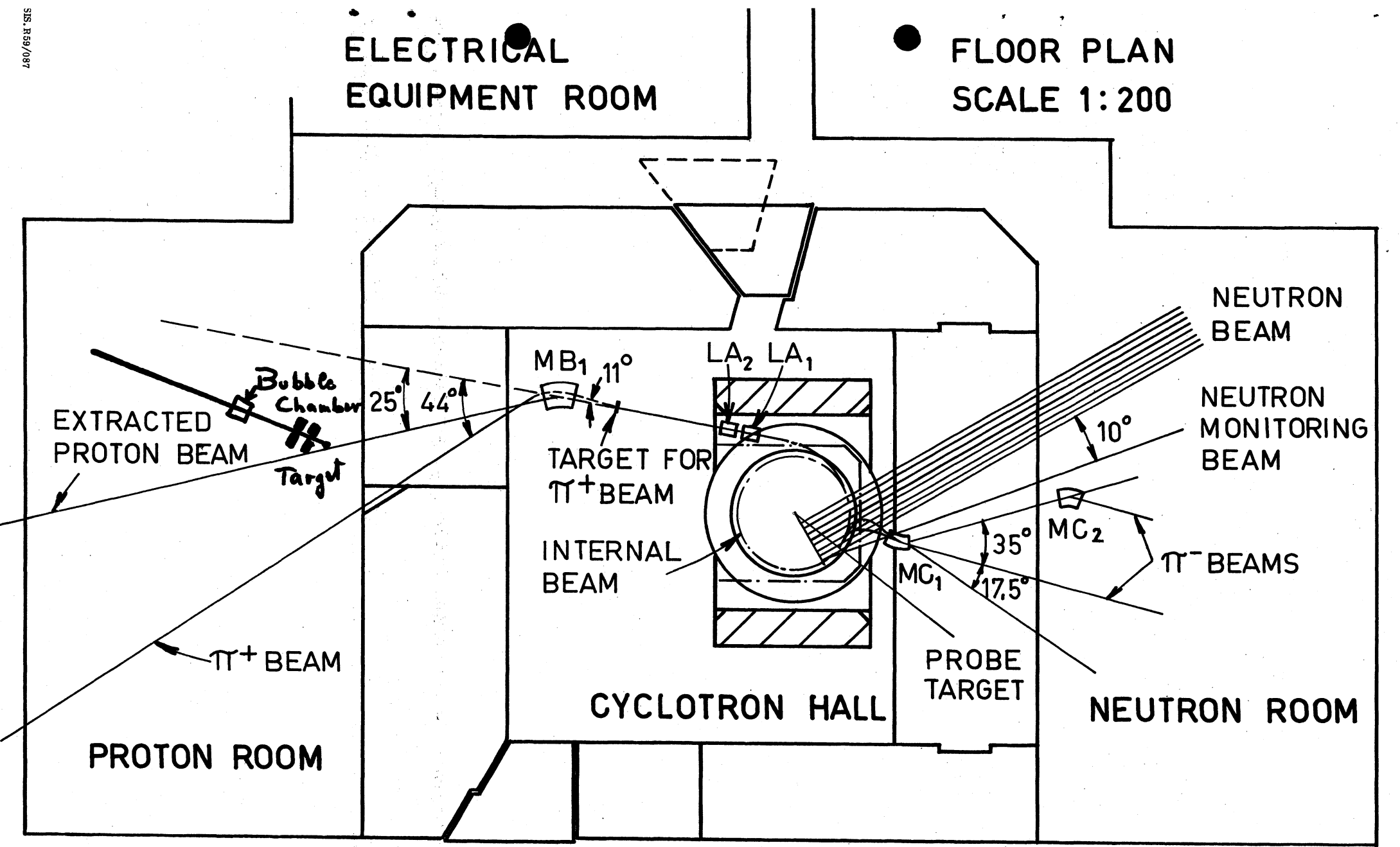
Are you supported by any national organization dealing with CERN matters ? yes If so, which ? Comitato Nazionale per le Ricerche Nucleari

Please show on a floorplan the proposed arrangement of the experiment:

1. Which beam is used : Extracted proton beam (see also enclosed floorplan) (See remarks please).

ELECTRICAL EQUIPMENT ROOM

FLOOR PLAN SCALE 1:200



HEIGHT OF BEAM ABOVE FLOOR LEVEL : 1.25m

EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

QUESTIONNAIRE CONCERNING PROPOSED EXPERIMENT
WITH THE CERN CYCLOTRON

by : Cernigoi Cesare

date : 25th September, 1959.

Complete address : Istituto di Fisica della
Università, Trieste (Italy).

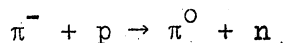
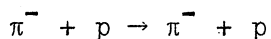
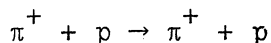
Short title of experiment : Forward scattering amplitude
measurement of the process:
 $\pi^- + p \rightarrow \pi^0 + n$.

Nature and purpose of the experiment:

The purpose of the experiment is the direct measurement of the forward scattering amplitude in the charge-exchange process: at an energy of the π^- near the $(\frac{3}{2}, \frac{3}{2})$ pion-nucleon resonance.

Combining this result with the present available data on the elastic scattering of the positive and negative pions it becomes possible to check the consistency of all the experimental data in the pion-nucleon scattering under the charge-independence hypothesis, taking also into account the requirements of the dispersion theory.

The correlation of the data under the above mentioned conditions can be established by a method, where only the total cross-section and the forward scattering amplitudes are needed for the three processes:



Until now the forward scattering amplitudes were deduced by the angular distribution coefficients; this method comes out to be rather difficult in the charge-exchange scattering, where the coefficients are deduced from the angular distribution of the

1. Which beam is used? π^- beam
2. What target, material and dimensions? Liquid hydrogen with mylar windows and liquid nitrogen cooling. Approximate dimensions are 1 meter high and 40 cm in diameter. The exact drawing will be sent shortly to the CERN workshop.
3. Show position of bending magnets and lenses: as usual for π^- experiments.
 - a) for bending magnets give identifying letters: MC_1 and MC_2 .
 - b) Probably no lenses are needed.
4. Show shielding with principal dimensions. To be decided after preliminary test. Is a roof required? No.
5. Describe detection equipment. 4 γ -rays telescopes - 4 Cerenkov counters - Beam telescope - related electronics. Coincidences are taken between pairs of γ -rays telescopes and between pairs of Cerenkov counters. All coincidences are gated by signals from the beam telescope.

Required Cyclotron Operating Conditions

π^- beam : π^- Experimental beam energy: about 170 MeV
 Average intensity 50,000 particles/sec over 15 cm² if possible.

Cyclotron Time Request:

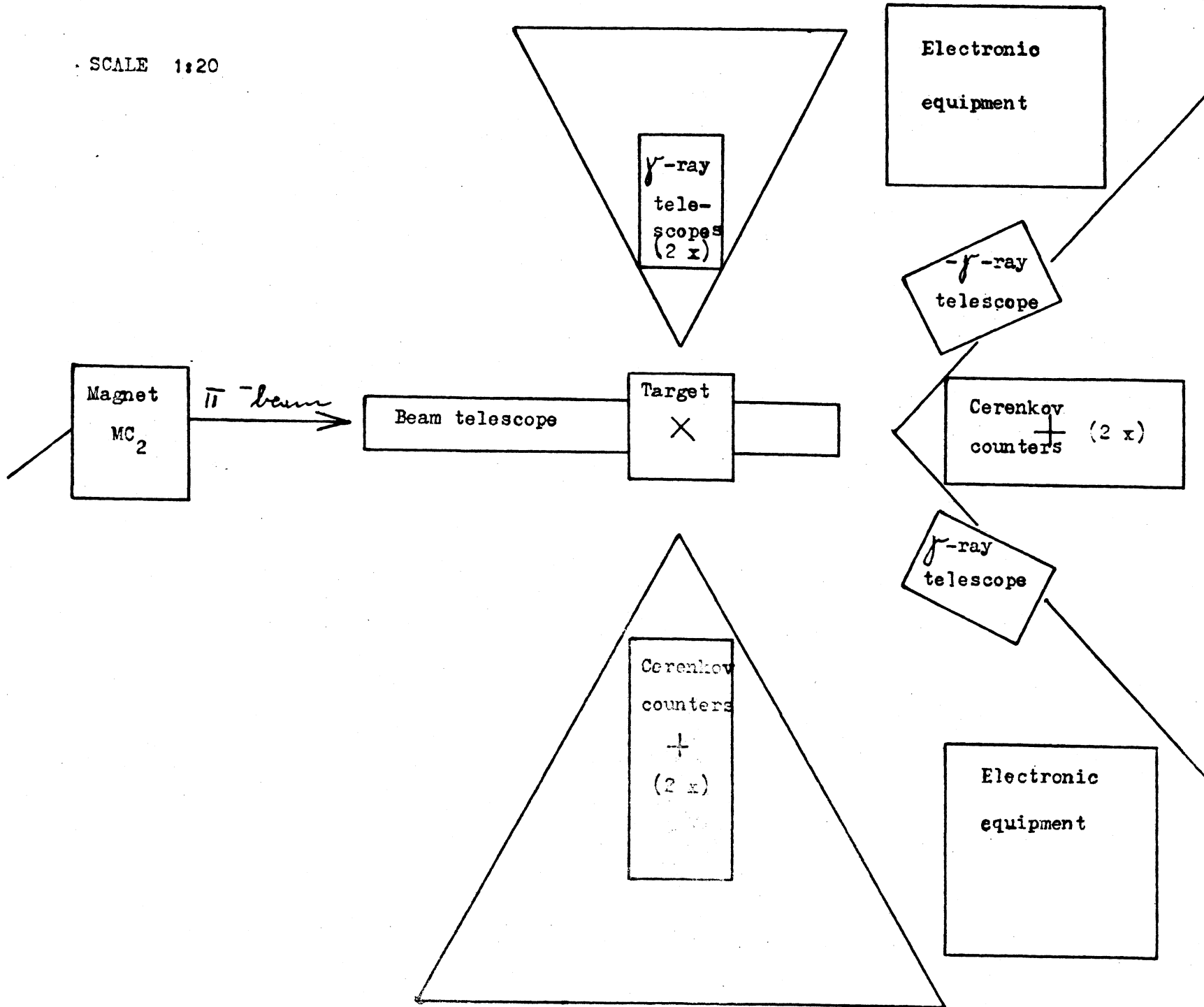
	Earliest date month, year	No. of shifts (8 hours/shift)
Preliminary test	January 15, 1960	3
Main run	February 15, 1960	90
Check run	---	-

Laboratory space request: 30 m²

Office space request: 10 m²

Remarks: In addition to the laboratory space required a storage room for the mechanical supports of the detectors would be appreciated. Dimensions : 5 x 4 x 3 m.

SCALE 1:20



EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

QUESTIONNAIRE CONCERNING PROPOSED EXPERIMENT

WITH THE CERN CYCLOTRON

by : B. Hahn
date : 25 September, 1959

Complete address Department of Physics,
University of Fribourg
Fribourg (Switzerland)

Short title of experiment : Bubble density versus particle velocity measurements in a sensitivity stabilized bubble chamber

Nature and purpose of the experiment :

It is proposed to measure the bubble density or mean gap length of bubble tracks produced in our 16 cm bubble chamber by protons in the velocity range $0.4 < \beta < 0.8$ ($100 \text{ MeV} < T_p < 600 \text{ MeV}$).

This experiment is expected to yield information on :

- a) the accuracy of particle velocity measurements by bubble counting on single tracks ;
- b) the mechanism of bubble formation.

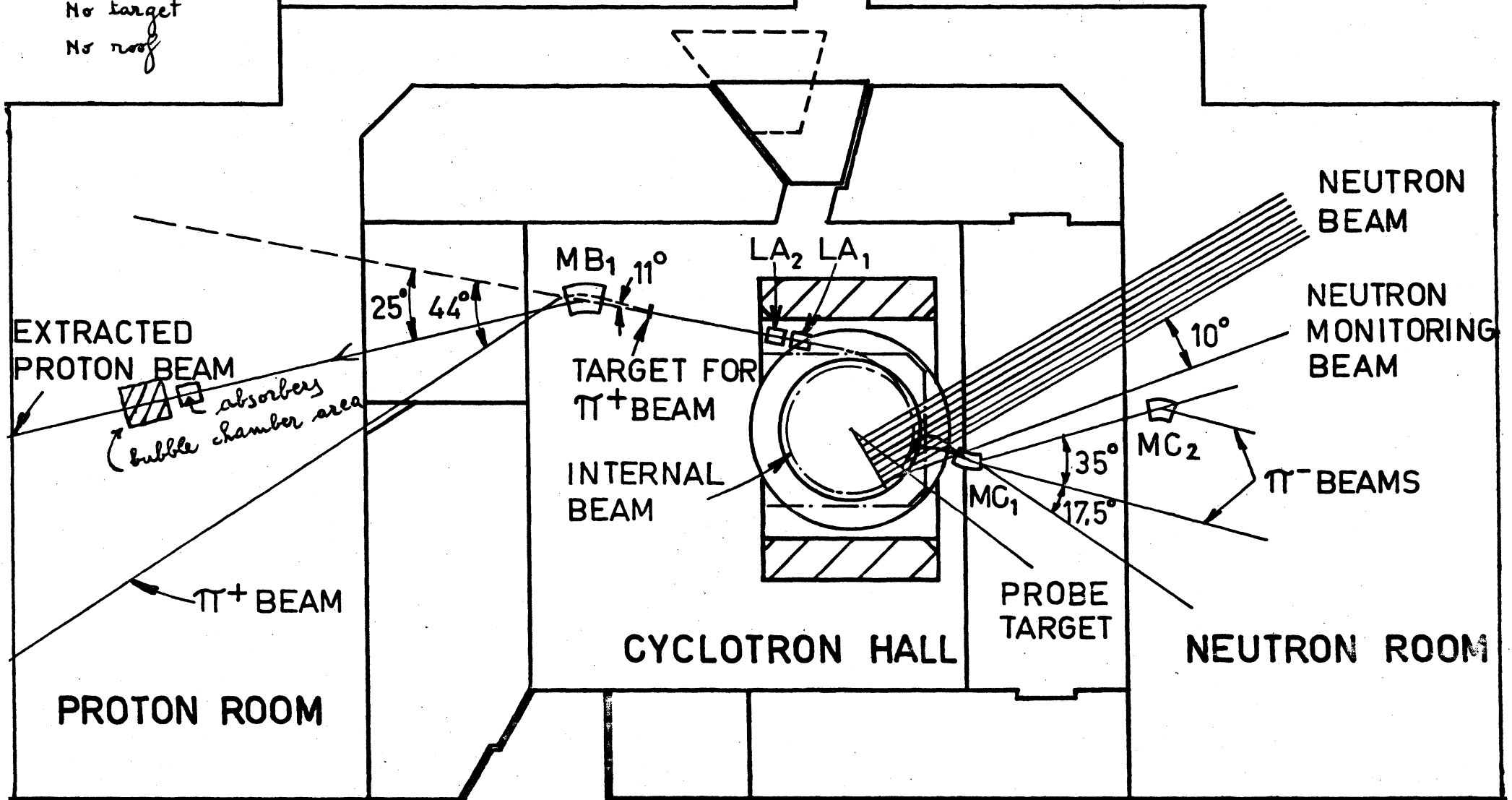
The bubble density S_b is expected to vary with the particle velocity β approximately as $S_b \propto 1/\beta^2$. When only 100 bubbles are counted, the momentum of e.g. 400 MeV protons can be determined accurate to $\pm 10\%$, considering the finite bubble statistics as the only source of error.

Our chamber is especially designed to yield constant radiation sensitivity (bubble density), and is provided with accurate temperature and final pressure stabilization. At each expansion there is a period of 20 msec of constant radiation sensitivity. A given bubble density is reproducible over months, and can be adjusted to any desired value in a few seconds. There will be no reference tracks necessary in each picture in order to ensure reliable

**ELECTRICAL
EQUIPMENT ROOM**

**FLOOR PLAN
SCALE 1:200**

Φ -beam extracted
MB, and LA, and LA₂
No target
No roof



HEIGHT OF BEAM ABOVE FLOOR LEVEL : 125m

EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

QUESTIONNAIRE CONCERNING PROPOSED EXPERIMENT
WITH THE CERN CYCLOTRON

by : Prof. P. BASSI
date : 29 September, 1959

Complete address : Istituto di Fisica - Via Irnerio 46,
Bologna (Italy)
Title of experiment : Complete survey of P-P interaction
at 600 MeV

Purpose of the experiment : This experiment is intended to give
a complete set of total and different cross-sections for all
different reaction channels in one experiment.

Are you supported by any national organization dealing with CERN
matters? "Yes", by CNRN - INFN.

Please show on a floorplan the proposed arrangement of the experiment:

1. Which beam is used? external proton beam (600 MeV) scattered at
small angle
2. What target, material and dimensions? carbon target

Required Cyclotron Operating Conditions

Proton energy: 600 MeV, Experimental beam energy 1 MeV
Average intensity 10 particles/pulse over 30 cm²

Cyclotron Time Request

	Earliest date month, year	No. of shifts (8 hours/shift; 3 shifts/day)
Preliminary test	January, 1960	6
Main run	January, 1960	10
Check run	February, 1960	6

Remarks:

A full written account of the experiment has been already given
to Profs. Bakker, Bernardini, Preiswerk, Peyrou, Goldschmidt-Clermont
during a meeting in June, 1959.
