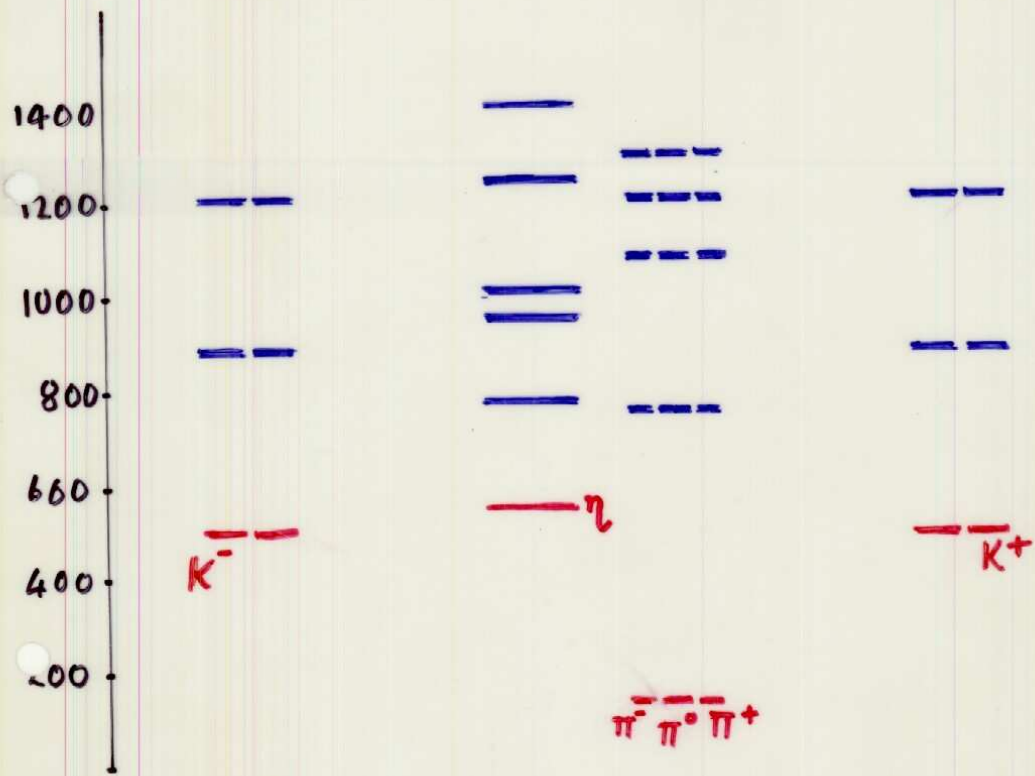


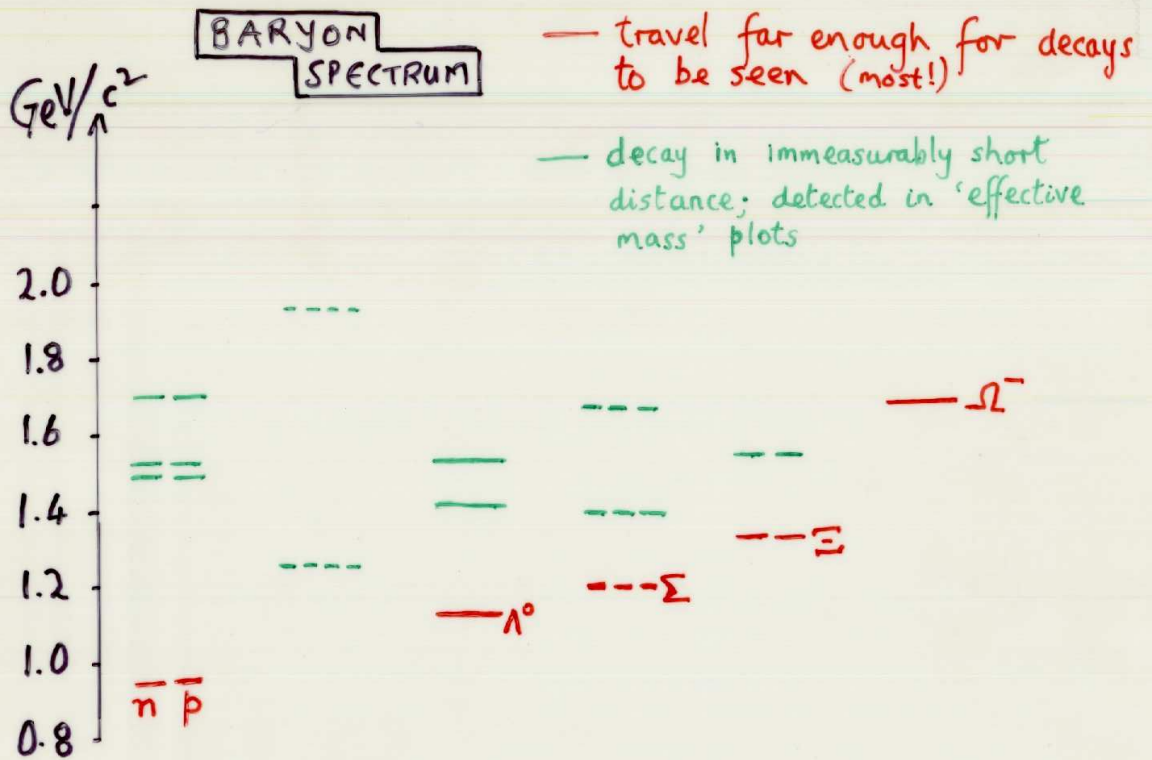
MESON SPECTRUM

Mass in MeV/c^2



— (Most) TRAVEL FAR ENOUGH FOR DECAYS TO BE SEEN

— DECAY WITHIN IMMEASURABLY SHORT DISTANCES;
DETECTED AS 'BUMPS' IN 'EFFECTIVE MASS' PLOTS



So what? Only some masses \Rightarrow only some energies
 \Rightarrow QM + constituents \rightarrow SPECTROSCOPIC EVIDENCE FOR QUARKS

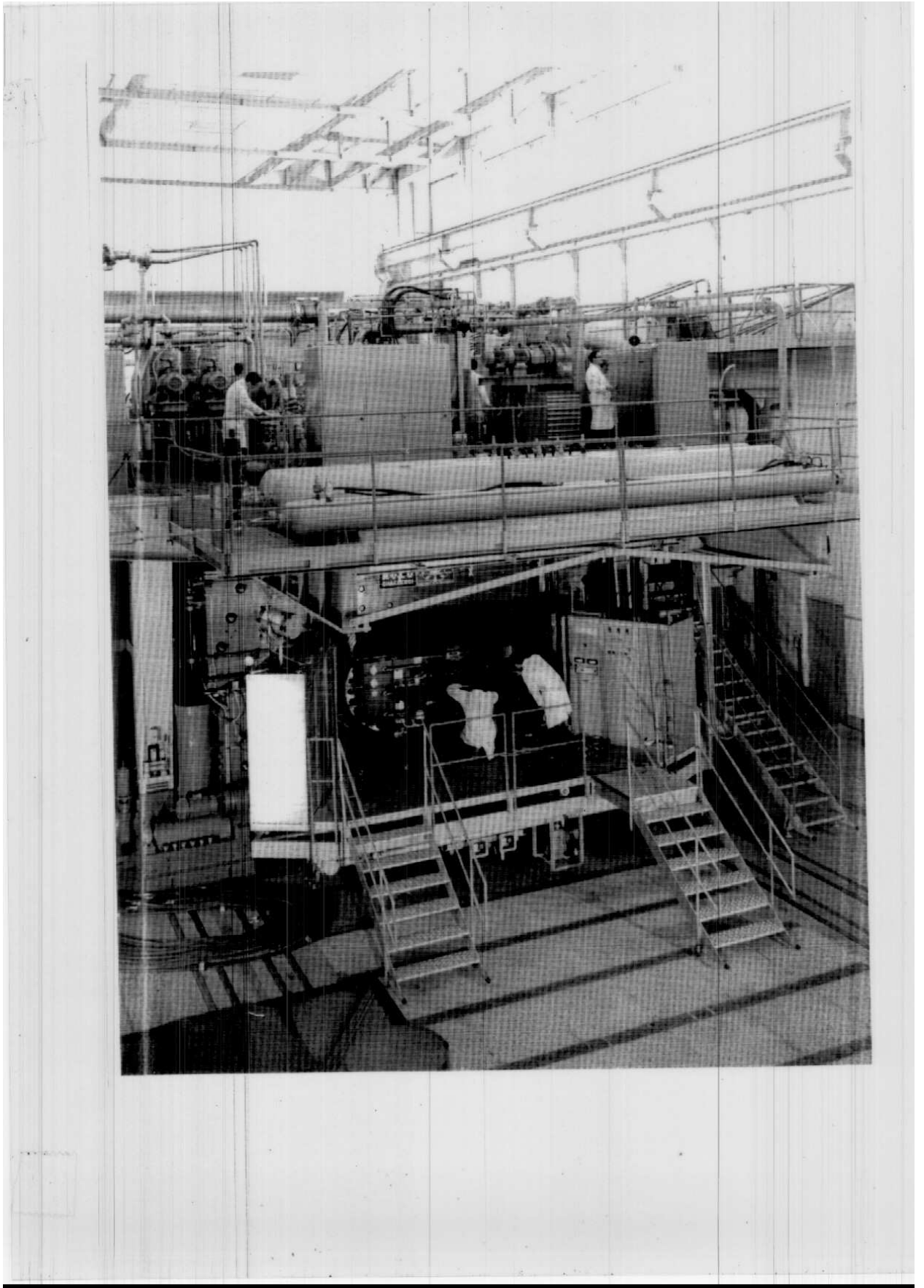
When the nucleon revealed its presently known spectrum, we may have hoped to have before us the essential ingredients for the understanding of its structure, just as the Balmer formula of the hydrogen spectrum gave Bohr the clue for its dynamics.

Quantum Theory + Elementary Particles
Victor F Werskopf
CERN 65-26, 1965

THE BUBBLE CHAMBER

When charged particles force their way through a specially prepared liquid (such as superheated hydrogen), they leave trails of bubbles which can be photographed to give a permanent record of the particles' trajectories.

- The Physical Principles of Particle Detectors →
 - A Simple Estimate of the Mass of the Positron →
 - A Lot can Happen in a few Millionths of a Second
- See BC website

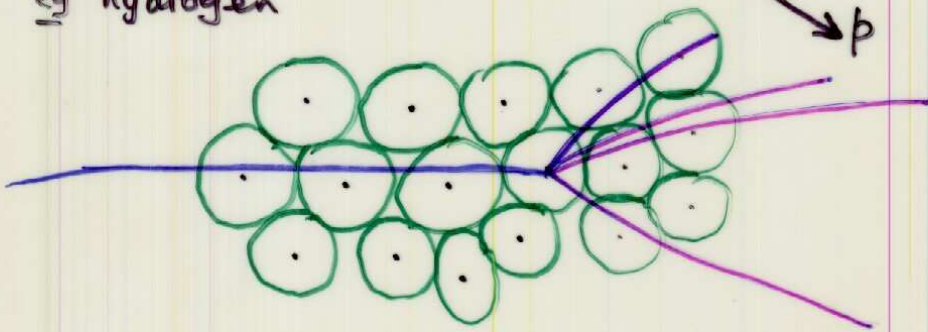


Typical particle physics experiment

CERN HST 500



Bubble chamber is both TARGET and DETECTOR
eg hydrogen



Typical beam energy \sim GeV

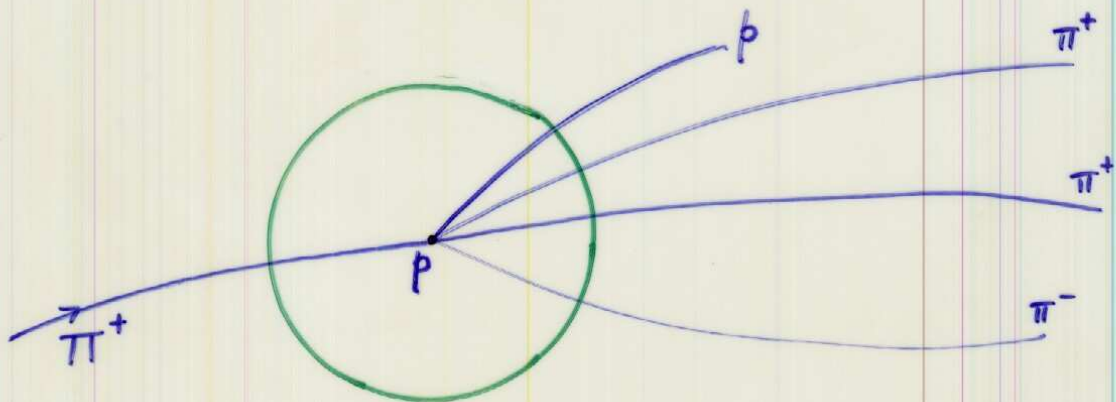
To ionize atom \sim 10 eV

[Highly relativistic particle loses \sim 0.25 MeV/cm in H_2]

COLLISIONS and DECAYS

eg.

COLLISION



Q: $1 + 1 \rightarrow 1 + 1 + 1 - 1$ ✓

DECAY

