

IV.4. L. Resegotti - Survey of the CERN bubble chamber project.

We would like to take this opportunity to discuss with the other bubble chamber groups at the meeting the present plans for the CERN propane chamber.

The chamber. The present drawings show a stainless steel cylindrical chamber 50 cm deep, 1 metre useful diameter and total volume about 500 litres. Expansion will take place by means of a membrane which will move back to a hole plate, supported by a thick mild steel disc, through which will pass the expansion channels and the flash tube supports. The single glass window will be shielded by a safety tank about 1.5 m deep in which will be maintained a pressure of nitrogen equal to the static propane pressure. A network of copper pipes on the outside of the bubble chamber body and on the inside of the safety tank will be used for temperature control by means of a water circulation system.

The magnet. The magnetic field will be produced by two groups of water cooled circular pancakes of square section copper conductors enclosed in a mild steel shell, with a large aperture on the window side, and the thick mild steel disc of the chamber base as a pole. Support for the chamber and safety tank, as well as for some of the expansion system will be given by the magnet body. A method of transport for the magnet has not yet been devised, but it is intended to make it rather easily movable over the PS experimental area.

Cooling problems with the magnet limit the dissipation to about 4.5 MW which should give a flux density of at least 18 kilogauss at the centre of the chamber.

Illumination. A 1/3 scale water filled optical model has been studied and gives very satisfactory results. It is expected that the deterioration due to the lower refractive index of liquid propane in the real chamber will not be very serious. It is proposed to use 8 straight flash tubes arranged around the wall of the chamber and enclosed in sets of cooled circular fins in pressure proof glass pipes immersed in the propane so that the cameras cannot see the lamps directly. In the model the illumination varied at most over a factor of 4.

By means of a suitable mechanism it will be possible to replace flash tubes quickly and safely.

Expansion mechanism. Circular rubber diaphragm type valves are being studied for the expansion mechanism. These will be controlled by auxiliary Barksdale type valves. It is planned to make a full scale model of the expansion mechanism and the bottom of the chamber, which, if successful, will be the part of the actual chamber.

Beam windows. The beam transport systems at present envisaged for the PS will have a beam output area of some 14 cm x 20 cm. It is probable that to accept fully a beam of this section it will be possible to do no better than to thin part of the wall of the chamber to about 2 cm. It may be decided to arrange the wall so that a much thinner window, say 2 mm, can be fitted over a smaller surface.

DISCUSSION.

A very long discussion about the CERN propane bubble chamber took place.

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