The Veto System

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Abstract

This note describes the Veto system used at the end of the 2001 run.

The Veto system consists of the flowing detectors:

- $VI1$
- $V01$
- $VI2$
- Vbl
- part of scintillating fiber stations 1& 2

The location of the different components is shown in fig 1

The following figures show in detail the different components: $VI1$ (fig. 2), $VO1$ (fig. 3), $VI2$ (fig. 4) and Vbl (fig. 5)

For $VI1$, $VO1$, $VI2$ and Vbl the veto signal is just the OR of all paddles. For $Vscifi$ the situation is a little bit more complicated. Here only particles with a given slope in y-direction are vetoed as shown in fig. 6. The reason is to reduce the dead time: Only muons with a given slope cause a trigger without interaction in the target, so only these should be vetoed. The Japanese scifi stations have 6 lemo outputs of which the upper and lower two of the horizontal fibers are used in the first two scifi stations (SF1 and SF2). The veto condition for $Vscifi$ reads:

$$Vscifi = (SF1_1 + SF1_2) \cdot (SF2_5 + SF2_6) + (SF1_5 + SF1_6) \cdot (SF2_1 + SF2_2)$$

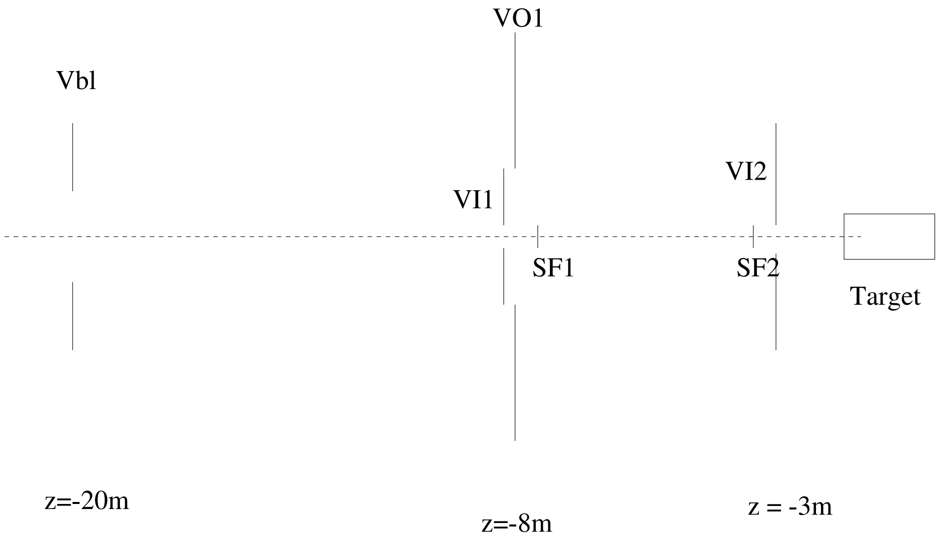

Figure 1: The different components of the veto system.

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The total Veto condition is then simply:

$$VTOT = VI1 + VO1 + VI2 + Vbl + Vscifi$$

and the trigger condition is

$$TRIGGER = H4 \cdot H5 \cdot \overline{VTOT}$$

where $H4 \cdot H5$ means the coincidence of two hodoscope planes.

Table 1 shows the reduction of the trigger rate due to the different veto sub systems. $Vscifi$ doesn't appear in the table. It increases the total dead time form 17% to 18%. The MIDDLE trigger rate is reduced by 20%, i.e. it goes down from 2.3% to 1.8%.

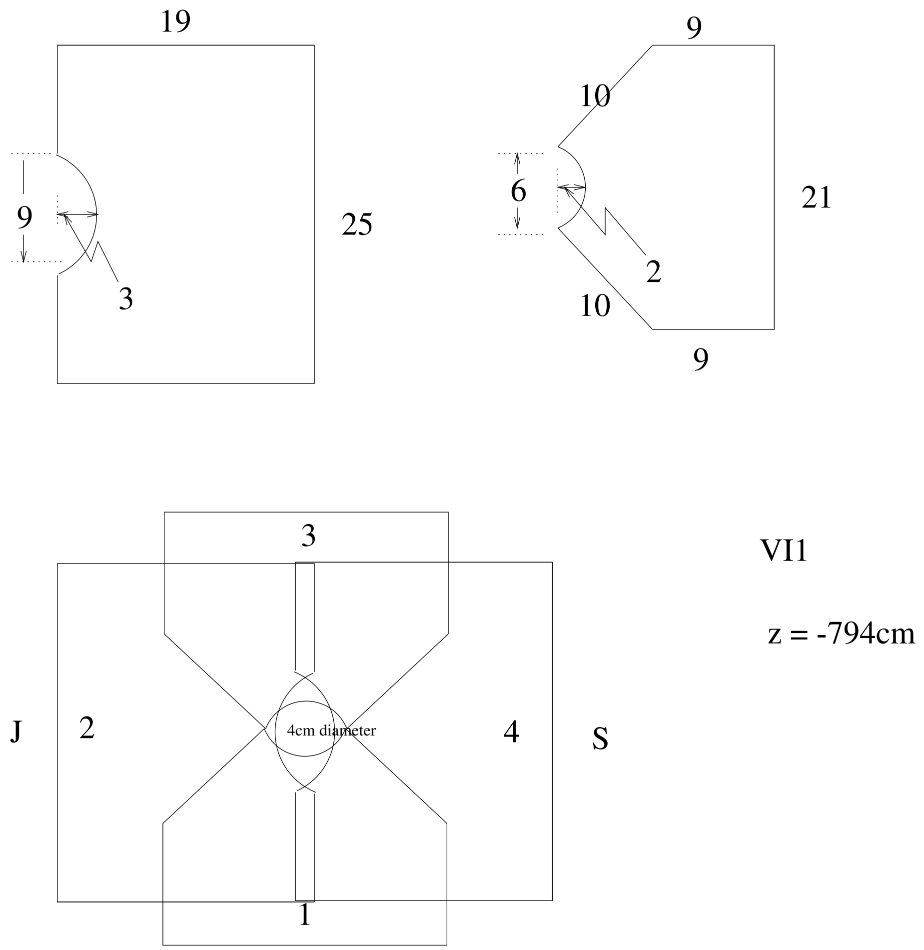

Figure 2: $VI1$

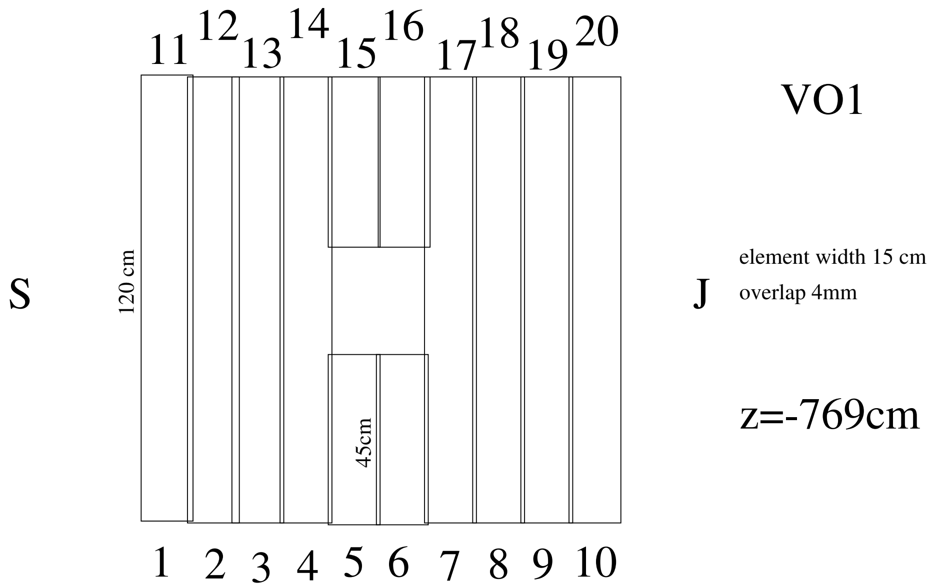

Figure 3: $VO1$

	INNER	MIDDLE	LADDER	dead time
no veto	100	100	100	0
$VI1$	36	31	29	6
$VO1$	87	58	69	1
$VI2$	41	37	33	12
Vbl	59	22	40	2
$V1 = VI1 + VO1$	32	6.2	13	7
$V1 + VI2$	24	3.7	7.8	15
$V1 + Vbl$	27	3.3	10	8
$VI2 + Vbl$	30	10	16	13
$V1 + VI2 + Vbl$	20.5	2.3	6.7	17

Table 1: The reduction of the trigger rate for the different subsystems and different triggers in %. The last last column shows the dead time in % for the nominal beam intensity of $2 \times 10^8 \mu$/spill. These number were obtained offline analysing run 11768.

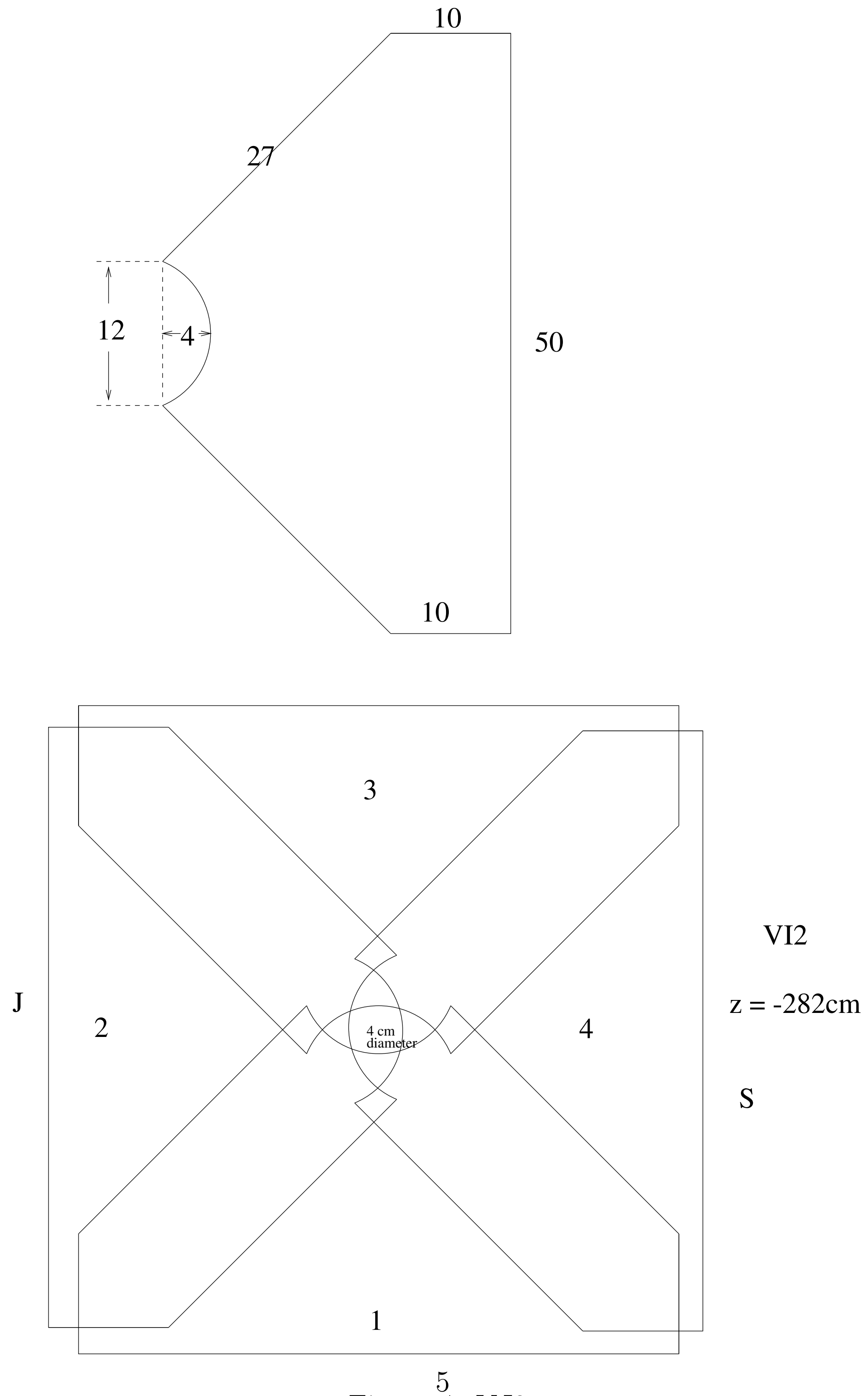

Figure 4: $VI2$

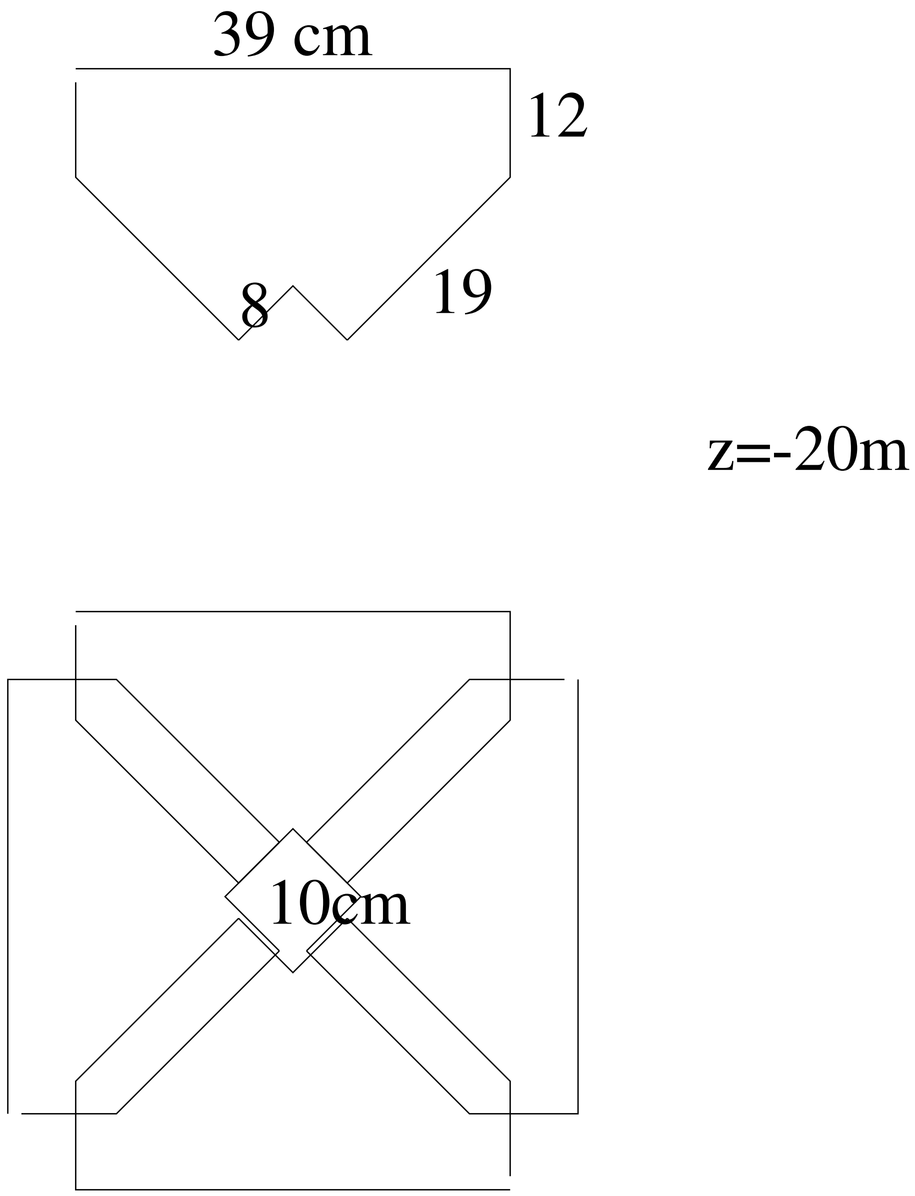

Figure 5: Vbl

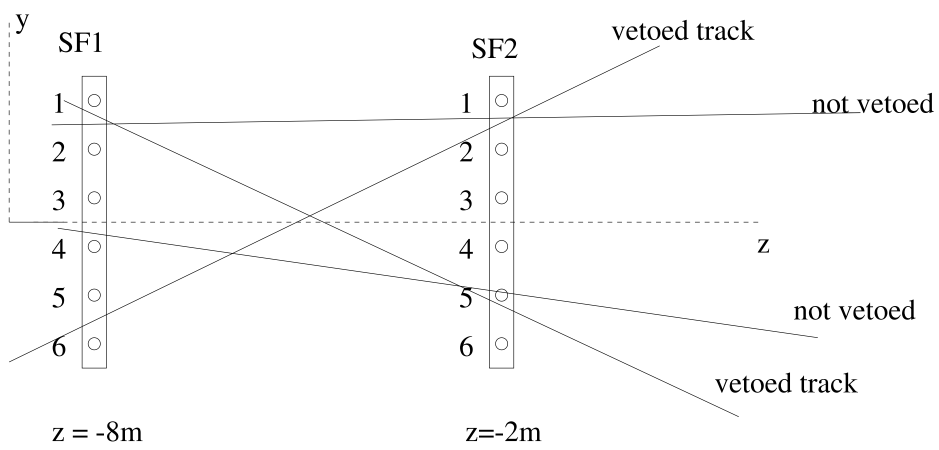

Figure 6: The scifi Veto