

REPORT ON JINST_008P_0314

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TITLE: Design of the MiniCLEAN dark matter search veto detector subsystem

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Referee report

The draft describes the veto detector system of the MiniCLEAN dark matter search experiment. I suggest the draft to be submitted as a Technical Report, because it mainly describes the technical points of the hardware system to be built. I would suggest following items in the draft to be made cleared before accepting for the publication. 1) In Figure 1 there are no names and sizes of the instruments consisting the veto system; the diameter and the height of the veto tank although they are described in the main text. Also, the size, volume and the weight of the central detector tank of the liquid argon which is supported by the 4 rods are not given. And there is no explanation about the thick green tube going from the central detector tank to the outside of the veto tank. 2) There should be some description about the water system which provides the water to the veto tank. Is the water purified? If so, what is the purification method? What is the temperature of the water? This should be mentioned in the view point of dark counts of the PMTs. What is the temperature in the measurement of the dark count mentioned as 3000Hz in section 2.1? 3) What is the lining material of the veto tank surface? Is the color of the lining blue as shown in the figure 1? What is the reflection efficiency of the lining material? 4) What is the meaning of the muon detection efficiency (99.95) In figure 2 there is no blue line for noise data. The three yellow lines of simulation are hard to see. What does each

of the three yellow lines mean? 6) Figure 4. The numbers and names of the parts in the left figure are too small to be read. Also, the yellow lines to indicate the parts are very hard to see. In the right picture please give the numbers corresponding to the parts shown in the left panel. 7) Are there any coils around the veto tank to cancel the earth magnetic field at the central detector tank? Also, is there any measure on the veto PMTs to protect them against the external magnetic field? 8) The HV is distributed to 8 veto PMTs by one Amplifier discriminator card. However, the HV values of each of PMTs vary in 1800-2300V as described in page 3. How is the HV of each PMT adjusted? 9) The horizontal and vertical scales in the pictures of oscilloscope in figures 7 and 8 should be given. 10) Are the words, board and card, for the amplifier discriminator the same? If so, they should be unified.