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# Static Charge Control Plan for High-Density Electronics Centers

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**Abstract :** Ensuring a safe environment for sensitive electronics boards in places with high limitations in size poses two major difficulties: the control of charge accumulation in floating floors and the prevention of excess charge generation due to air cooling flows. In this paper, we discuss these mechanisms and possible solutions to prevent them. An experiment was made in the control room of a Cherenkov Telescope, where six racks of 2x1x1 m size and independent cooling units are located. The room is 10x4x2.5 m, and the electronics include high-speed digitizers, trigger circuits, etc. The floor used in this room was antistatic, but it was a raised floor mounted in floating design to facilitate the handling of the cables and maintenance. The tests were made by measuring the contact voltage acquired by a person who was walking along the room with different footwear qualities. In addition, we took some measurements of the voltage accumulated in a person in other situations like running or sitting up and down on an office chair. The voltages were taken in real time with an electrostatic voltage meter and dedicated control software. It is shown that peak voltages as high as 5 kV were measured with ambient humidity of more than 30%, which are within the range of a class 3A according to the HBM standard. In order to complete the results, we have made the same experiment in different spaces with alternative types of the floor like synthetic floor and earthenware floor obtaining peak voltages much lower than the ones measured with the floating synthetic floor. The grounding quality one achieves with this kind of floors can hardly beat the one typically encountered in standard floors glued directly on a solid substrate. On the other hand, the air ventilation used to prevent the overheating of the boards probably contributed in a significant way to the charge accumulated in the room. During the assessment of the quality of the static charge control, it is necessary to guarantee that the tests are made under repeatable conditions. One of the major difficulties which one encounters during these assessments is the fact the electrostatic voltmeters might provide different values depending on the humidity conditions and ground resistance quality. In addition, the use of certified antistatic footwear might mask deficiencies in the charge control. In this paper, we show how we defined protocols to guarantee that electrostatic readings are reliable. We believe that this can be helpful not only to qualify the static charge control in a laboratory but also to asses any procedure oriented to minimize the risk of electrostatic discharge events.

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