§42-17 Installation and Trial Operation of CAD System for ASIC Circuit Diaphragm

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CADs for application specific integral circuits (ASIC) are installed on personal computers in NIFS, and first trial of making circuit diaphragm are carried out.

The ASIC is useful to digitize analog signals from multichannel detectors such as a photo multiplier and semiconductor pixel detector. The multichannel detector is important for plasma diagnostics. Typically, impurity transport is estimated from the radial profile of line emissions.

It is the specific advantage of the CADs that the circuit diaphragm are made as source codes. Then, the first trial diaphragm will be improved by referring the experimental results to be obtained. Especially, in the present research it is interested in to try pulse height analysis for x-ray spectrum measurement. It is also important for deuterium discharge that the diaphragm will be made for p-type silicon substrates. In LHD the polarity of high resistive n-type silicon is predicted to be reversed by the defects due to direct neutron irradiations in a few days. It is expected that the p-type silicon is damaged by the neutron much more slowly than the n-type to try x-ray measurements. Then, the p-type silicon is preferred for plasma experiments.

The installed CADs are supplied through VLSI Design and Education Center (VDEC), University of Tokyo. The installations are also carried out in accordance with a manual supplied from VDEC.

In the present research the CADs are installed in a Linux based personal computer. The PC is used as a server to be accessed from another computer operated by CAD user. It is also available to access from windows OS based PC.

In the first operation, the CADs successfully works to make simple diaphragm such as a simple operation amplifiers. However, there become some problems. The most serious problem is the performance of the server PC such as the quality of video display and the ability of CPU.

To solve the problem, it is important to choose PC. The CADs need the elder version of Linux OS. Then, it is difficult to use some recently manufactured work stations as the servers. Actually, the video card in the work station is too hard to be operated by the elder OS.

These works are progressed to solve the problems without any support for help, which is intrinsically important in the present research. As next stage layout diaphragm is interested in. Currently, the trial operation is planning.

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