

## §1. Experimental Radiation Observed with RMSAFE

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RMSAFE (Radiation Monitoring System Applicable to Fusion Experiments) is an area-monitoring sensor network system installed in the Toki Site. This is capable of discriminating and accumulating the burst-like exposures due to plasma experiments as well as observing the continuous background radiation levels. The system has brought into operation since 1992.

As the LHD machine is under construction, we do not have radiations from main experiments. There are, however, some minor signals of radiation other than natural background.

In the Plasma Heating Laboratory, R&D experiments for the NBI (Neutral Beam Injector) system are going on. Here electron beams up to 125 keV energy can be associated with the operation of the negative ion source placed in a Teststand, so that bremsstrahlung X rays may be radiated. In order to monitor the indoor radiation level, two air-filled ionization chambers have been set up; one is placed close to the Teststand and named as "NBI Monitor", the other is at the nearest worker's place in front of liquefier controlling panel. Distances from the source point are 5m and 10m, respectively.

One of the outdoor monitoring posts of RMSAFE, IA, is situated just east of the building with a distance of some 50m from the NBI Teststand area and a pressurized Ar ion chamber is installed. This sensor (IA-X) has been found sensitive enough to record the NBI shots as well as the indoor monitors.

Figure 1 show the X ray events observed by NBI Monitor on June 7, 1994. The count sensitivity of the detector is one signal pulse per 10 nGy and the sampling period is 30 sec, while the number of experimental shots in one week is usually 100~2000. The data are expressed as effective dose rate in  $\mu\text{Sv/h}$ . Figure 2 is giving the data record of IA-X during the same period with the same sampling frequency. It should be noted that the natural background radiation level

is 70~80 nSv/h at IA-point. Relationship between these two observations is shown in Fig. 3, where a clear correlation is seen. The dose obtained at outdoor point IA is 4 orders of magnitude less than the indoor NBI Monitor level. This is quite understandable as due to the shielding effect of building wall and the monitor distances.

The usefulness of RMSAFE in examining artificial radiations hss also been proven at the work of in situ facility strucure check using X rays.

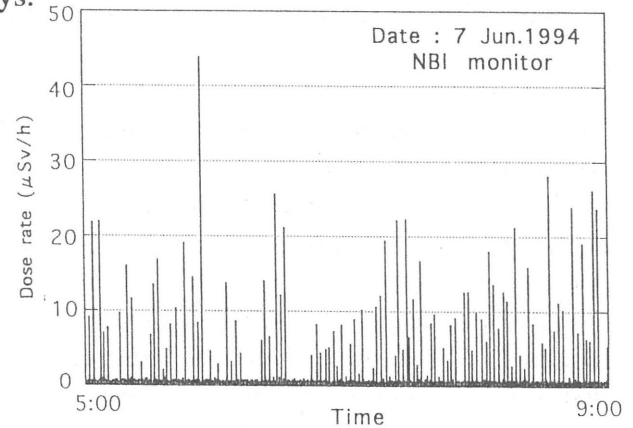


Fig. 1 Radiation dose observed by NBI Monitor

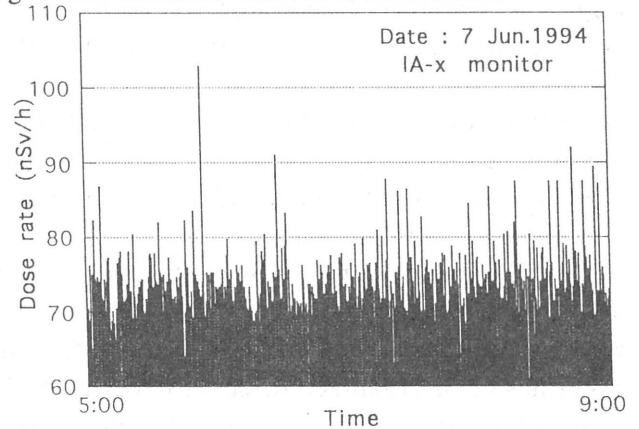


Fig. 2 Radiaton dose observed by IA-X monitor

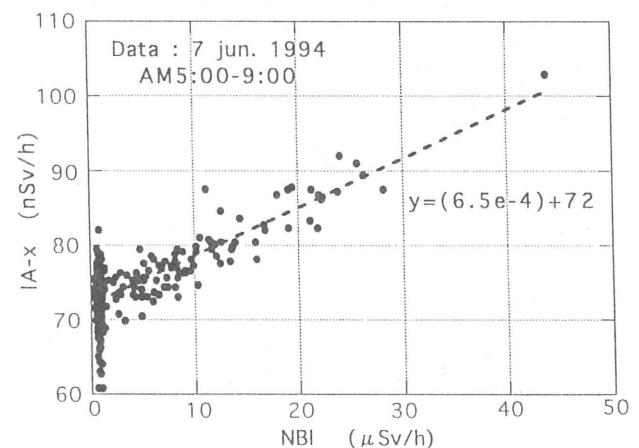


Fig. 3 Comparison of the data from NBI Monitor and IA-X