

§6. Installation of Thomson Scattering System in GAMMA 10

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We plan to measure the electron temperature by using a Thomson scattering system in GAMMA 10 by the collaboration with National Institute for Fusion Science (NIFS). In recent years, the direct electron heating experiments by central cell electron cyclotron heating (ECH) have been carried out. The highest electron temperature, about over 500 eV, was estimated by a soft x-ray measurement. We will be able to execute a crosscheck with the newly installing Thomson scattering system for more reliable data evaluation.

The installed Thomson scattering system was the same concept system as those installed in CHS and LHD in NIFS. We used the high power YAG laser (1064 nm, 2 J/pulse), a

focusing lens ($f = 2 \text{ m}$, $\phi = 50 \text{ mm}$), collection mirror ($\phi = 600 \text{ mm}$, $R = 1200 \text{ mm}$), bundled optical fiber (input $2 \times 3.5 \text{ mm}$, output $\phi = 3 \text{ mm}$, length of 5 m) and the NIFS 5 channel polychromator with avalanche photodiode. We used the 90 degree Thomson scattering system. This system will be able to measure the electron temperature range from 0.02 to 10 keV with 0.01 keV resolution, and its measurable radial range is about $\pm 200 \text{ mm}$ with space resolution of about $\Delta d \sim 20 \text{ mm}$. The sampling rate of the system is 10 Hz. We show the schematic view of the GAMMA 10 Thomson scattering system in Fig. 1. In this fund year, we had not obtained the Thomson scattering signals yet. However, we could successfully carry out the Raman scattering and Rayleigh scattering experiments with nitrogen gas in GAMMA 10. Then we will try to measure electron temperature by using this Thomson scattering system in next fund year.

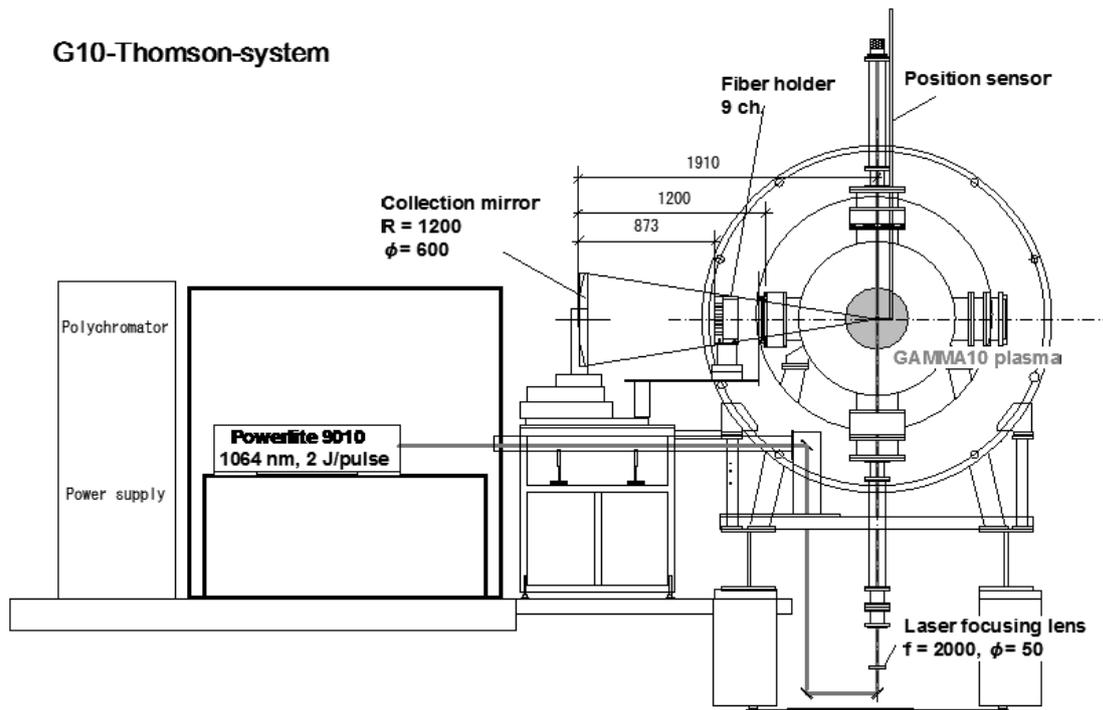


Fig. 1: Schematic view of GAMMA 10 Thomson scattering system.