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The high density plasma experiment device (HPX) is now under construction at Toki new site. This device is a linear plasma device with 10 magnetic coils, and is designed for studying (a) high density plasma production and its application to fusion related devices, (b) edge plasma physics, (c) physics of magnetohydrodynamic waves, and (d) advanced basic plasma physics.

The dimensions of HPX device are 30 cm in diameter and 260 cm in axial length, and the magnetic field intensity is 3 kG. The plasma is produced by microwaves with a frequency 2.45GHz. The microwave generated by a magnetron oscillator (15 kW (CW)) is launched from the open end of the field line to excite an electron cyclotron wave (ECW). The ECW has a great advantage that there is no cutoff for any high density plasma, and the accessibility condition is always satisfied to be absorbed in the ECR layer. In a previous experiment, we dem-

onstrated that a plasma density more than 10^{13} cm^{-3} was achieved with the 5 kW microwave input [1], which is two orders of magnitude higher than the cutoff density of ordinary mode with the same frequency.

The unique characteristic of HPX device is that the x-y manipulator is located at the another open end of the vacuum chamber. The operation area of the manipulator is 20cm x 20cm with positioning error less than 0.01cm. Langmuir probes and loop antennas introduced from the x-y manipulator are capable of 2-dimensional measurement on a plane vertical to the chamber axis. Moreover, the combination of the manipulator and a linear drive in the axial-direction makes us possible to allow the full 3-dimensional measurements such as 3-dimensional wave pattern measurement. Detailed information concerning the wave absorption will be obtained with this combined system.

The construction of HPX device will be completed in August, and the first plasma will be produced at the beginning of September.

References

[1]: M. Tanaka et. al., Journal of the Physical Society of Japan 60 (1991) 1600.

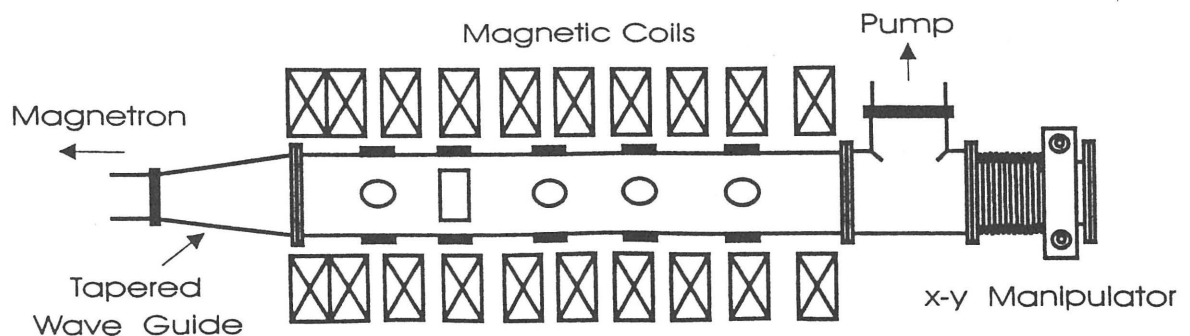


Fig.1 Schematic View of HPX Device