§6. Joint Stellarator Database

Yamada, H., Okamura, S., CHS Group
Murakami, M., Dory, R., ATF Group (Oak Ridge National Laboratory, USA)
Stroth, U., Geiger, J., W7-AS Team (Max-Planck-Institut für Plasma Physik, Germany)
Sano, F. (Kyoto University)

The integration of the global scaler data from 5 experiments, i.e, ATF(ORNL,USA), Wendelstein 7-AS(IPP, Germany), Heliotron-E(Kyoto Univ.), CHS(NIFS) and Wendelstein 7-A(IPP, Germany) has completed the first stage. All data installed in the database have been checked carefully so as to well describe standard performance of plasmas obtained in each device. The intensive comparative study with this database has just started.

This joint activity is being extended to a more comprehensive profile and configuration database. These comparative studies are of great importance for understanding present experiments, particularly, configuration effects on transport and MHD characteristics, and efficient conduction of next-generation experiments: LHD and W7-X. The benchmark test of the numerical code employed is a prerequisite to establishing a reliable database. The validity of the analyses used for the computation of finite-β equilibria and the power balance in W7-AS and CHS has been checked by doing benchmark tests before starting the integration of data. Also the format of the profile database has been fixed and arranged with considering the users who do not have any specific computational tools.

The VMEC code has been widely used to calculate the 3-D finite-β equilibria. The configuration database is constructed from the output file with a unified format.

Local transport analysis of the power balance is fundamental to discussing confinement characteristics. The groups other than W7-AS and W7-A use the PROCTR code for the profile analysis and the IPP group has their own code. Benchmark tests of the schemes used in W7-AS and CHS have been done for two examples, i.e., #18148 (discharge with 70GHz-ECH at 1.25T) of W7-AS and #15653 (discharge with both 28GHz and 53GHz-ECH at 0.95T) of CHS. Figure 1 shows the electron heat diffusivity given by the two methods. In conclusion, remarkable agreement is found between the two cases. Figure 1 also suggests that careful attention should be paid to the treatment of the geometry. When a simple circular geometry is considered, the local heat diffusivity becomes twice as large as the correct treatment of the geometry.

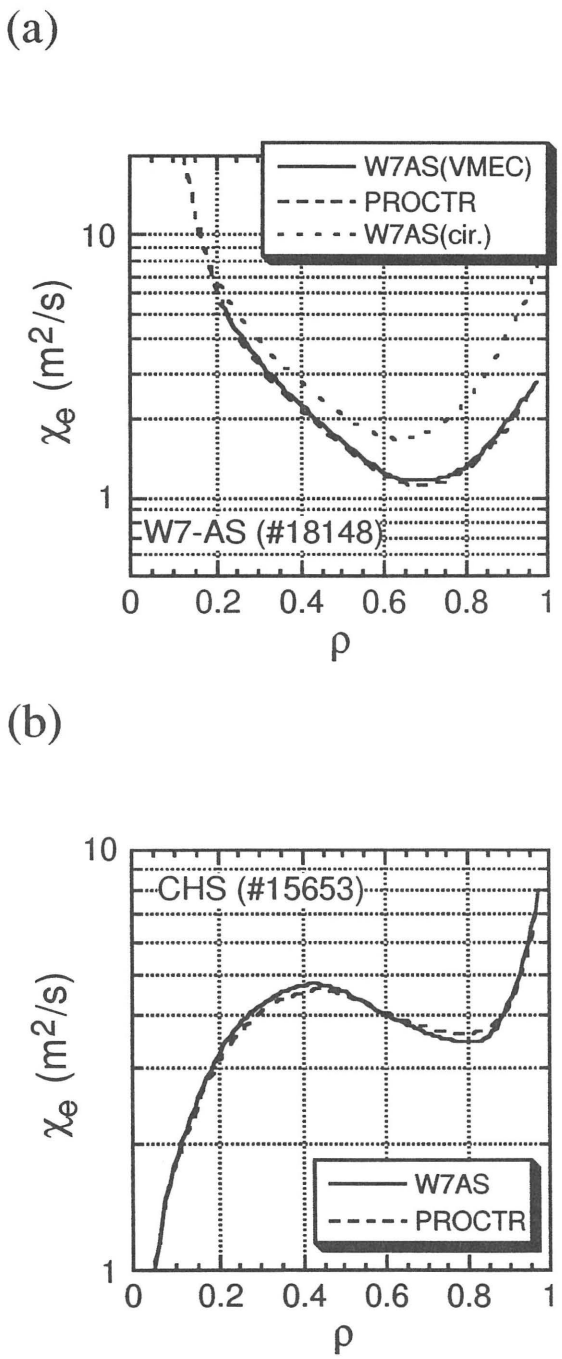

Fig.1 Electron heat diffusivity in (a) shot #18148 on W7-AS and (b) shot #15653 on CHS