DOI: 10.34854/ICPAF.52.2025.1.1.056

HEAT AND PARTICLE TRANSPORT SIMULATION IN COMPASS AND T-10 WITH CANONICAL PROFILE TRANSPORT MODEL *)

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The important tendency of toroidal plasma to conserve radial profiles of some values (for example, plasma temperature and pressure, toroidal rotation velocity) under various external influences has been discussed since early eighties [1-2]. Such profiles were called self-consistent or "canonical". The effect of their conservation was considered as manifestation of plasma self-organization and became the cornerstone of the Canonical Profiles Transport Model (CPTM) [3].

The report presents the CPTM simulation results using the ASTRA code for ohmic plasmas of circular limiter tokamak T-10 and D-shaped diverted plasmas of COMPASS. On top of that, ohmic and NBI heated H-mode in COMPASS was modeled. Obtained electron temperature and density profiles are consistent with the measured ones with RMS deviations within the range of experimental accuracy 10-15%. The runs demonstrated quite similar density profiles for ohmic and NBI heated H-mode plasmas in COMPASS and higher electron temperature pedestal for NBI heated H-mode in agreement with measurements (Fig. 1a). The results of L-mode simulation in COMPASS were compared with those obtained for T-10 ohmic shots. The stiffness coefficients in heat and particle fluxes equations for T-10 proved to be the same as for COMPASS (Fig. 1b).

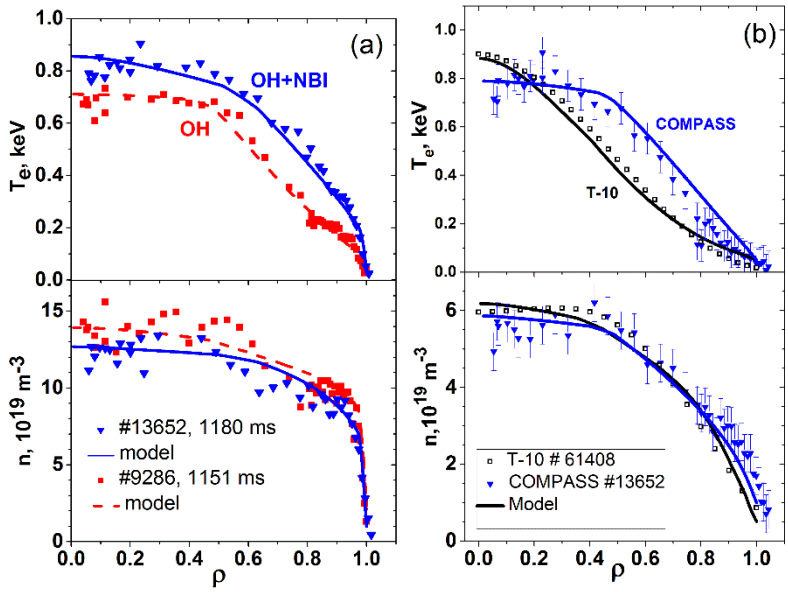

Fig. 1. a) Profiles of electron temperature and density in the H-mode on COMPASS with ohmic and additional NBI heating. b) Profiles of electron temperature and density in ohmic discharges on T-10 and COMPASS.

References

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*) abstracts of this report in Russian