Contribution ID: **3618** Type: **not specified**

P5.1078 The comparison of ion and electron anomalous heat conductivities in T-10 plasma

Friday, 12 July 2019 14:00 (2 hours)

See full abstract here http://ocs.ciemat.es/EPS2019ABS/pdf/P5.1078.pdf

The aim of this work is the determination of parametric dependencies of anomalous ion and electron heat conductivities in whole operational space of the T-10 tokamak. Verified experimental data base of plasma parameters, heat fluxes, and transport coefficients is made. It allow us to perform a background for transport analysis. Heat conductivities are determined from the steady state equation of heat flux continuity for ions and electrons:
[see equation on full abstract] (1)
where χ_e,i heat conductivity of electrons or ions, n_e,i - electron or ion density, T_e,i - electron or ion temperature, Γ_e,i - particle flux of electrons or ions, P_e,i - heat sources and sinks. Anomalous heat conductivities χ_e^an ≈ χ_e and χ_i^an = χ_i - χ_i^neo obtained from (1) is analyzed in T-10 discharges with different plasma parameters. It is shown that χ_e^an and χ_i^an have different dependencies on averaged density n¯e, effective charge Z_eff, and plasma current I_pl. These dependencies lead to the fact that the increase of ion heat conductivity corresponds to the decrease of electron one, and vice versa. In discharges with ECR-heating it is shown that χ_i^an grows in r/a = 0.5 - 0.8 region in discharges with on-axis ECRH and does not change with off-axis ECRH. For electron anomalous heat conductivity the well known result is obtained - the values of χ_e^an increases outside the region where auxiliary heating power is absorbed (see for example [1]).

References
[1] V. Erckmann, U. Gasparino. Electron cyclotron resonance heating and current drive in toroidal fusion plasmas. Plasma Phys. Controlled Fusion 36, 1869 (1994).

pppo

Presenter: NURGALIEV, M. (EPS 2019)

Session Classification: Poster P5