Contribution ID: **165** Type: **Poster**

TH/P2-11: Tokamak Discharges with Electron Thermal Conductivity Closed to the Neoclassical One

Tuesday, 9 October 2012 14:00 (4h 45m)

At the development of plasma transport models it is very important to have the asymptotic transitions to the cases when transport coefficients are well described by some first principle based theories. For the ion component of tokamak plasma this is a transition to results of the neoclassical theory (in Ohmically heated high density discharges). Another stable opinion has been formed in characterizing the electron transport, as being principally anomalous. Conclusions of L.A. Artsimovich [1], who analyzed the first tokamak experiments, are contributed to this. He called the electron thermal conductivity of the minimal level as "pseudo-classical"due to "classical"behavior of its dependences on plasma parameters despite of the several times higher amplitude. This opinion was supported later by B.B. Kadomtsev [2] and by many other authors. However, these conclusions have been done as a result of simplified consideration of transport processes using only diagonal terms of transport matrix. In this work it is shown that, taking into account the off-diagonal terms of neoclassical transport coefficient matrix, one can reduce imaginary anomality of electron thermal conductivity coefficients in tokamaks. Presented results of predictive modeling of several representative tokamak discharges with the ASTRA transport code [3] show that profiles of electron and ion temperatures measured in these experiments can be well described in the frame of the neoclassical transport theory. Contributions of different channels of energy losses from the ion and electron plasma components are investigated. So, results of the modeling of transport properties of high density discharges for some tokamaks show that electron and ion heat transport in the plasma core in these regimes can be described using the complete matrix of the neoclassical coefficients. Therefore minimal coefficients of electron heat transport in tokamaks are not pseudo-classical"but the neoclassical ones.
[1] Artsimovitch L.A., Nucl. Fus., 12 (1972), 215
[2] Kadomtsev B.B., Plasma Phys. Reports (Rus), V.9, N5 (1983), 938.
[3] Pereversev, G.V., Yushmanov, P.N., Preprint IPP 5/98 2002, Garching. Germany.

Country or International Organization of Primary Author

Russia

Primary author: Mr LEONOV, Vladimir (Russian Federation)

Presenter: Mr LEONOV, Vladimir (Russian Federation)

Session Classification: Poster: P2

Track Classification: THC - Magnetic Confinement Theory and Modelling: Confinement