SPONTANEOUS inlet OF LITHIUM film AS A TRIGGER OF ITB EVENTS in experiments on CO+COUNTER, CO – AND CONTR - ECCD IN THE T-10 TOKAMAK

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There are a large number of ITB event triggers (abrupt drop in heat and particle fluxes in the 30–60% of minor radius, first detected on the JT-60U tokamak, see details and references in [1], and
T-10 [2–3]). ITB events are accompanied by a bipolar perturbation of the electron temperature Te (simultaneous growth in the central and decay in the outer part of the plasma column). An example is experiments with the injection of C8H8 pellets on LHD [4] and deuterium pellets on T-10 [5], the drop of carbon flakes on TFTR [6] (in [5–6] shows the growth of Te in the central part of the column and it is not clear whether there is an abrupt and non-local decline in heat and particle fluxes). This report provides examples of ITB events, the new trigger of which is the spontaneous flight of a lithium grain in different modes with the generation current of EC waves. The report describes the formation of the ITB in the plasmas with co+contr, co- and contr- ECCD. Simultaneously with the increase in density during the ionization of the lithium grain, there is a simultaneous growth of Te in the central (0.1 < r/a < ≈0.5) and a decline in the outer part of the column, the heat flux falls in the zone 0.1 < r/a < ≈0.7. The growth of Te lasts 15–20 ms or about the energy life time. The figure shows the change in the profile of Te(r) before and at the end of Te growth. One can see the formation of ITB on both sides of the plasma column. However, the bipolarity of the Te perturbation is not the only possible consequence. It was found in some pulses that the electron temperature decreases or remains at the same level. Apparently, ITB-events are observed not all shots with flying lithium grain. Further analysis of the experiments is carried out.

References

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