CHARACTERISTICS OF BIG SCALE PLASMA OSCILLATIONS UNDER SLIGHTLY MODULATED ECRH

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The spacious oscillations in mode m/n=1/1 developing under modulated ECRH with periodical internal disruptions are analyzed. Anode gyrotron voltage contents a pulsing with amplitude ~ 2% that leads to modulation of SHF power in 10 – 15%. First harmonic of this disturbance is in range 1.5 – 2.5 kHz for different gyrotrons. Under ECRH, oscillations spread to half of the total plasma radius. Relative amplitude of oscillations in the central zone can surpass 40%.

It was determine that the areas of excitation for different modes of oscillations (m/n=1/1, 2/1, 3/2) are the total regions inside of corresponding rational magnetic surfaces. Those areas are inserted one to one that secures mutual influence of different structures as so called "mode coupling".

The oscillations are being force during several tens ms after the beginning of ECRH. Them frequency character obviously follow that for external force. The even harmonics develop only. Apparently, a mechanism of positive feed back between small change in electron temperature and amplitude of oscillations exists.

In the same time, oscillations keep natural characteristics. Them are not harmonic function and have natural frequency. So for mode m/n=2/1, it is ~ 3.5 kHz, for mode m/n=1/1 natural frequency close to 6 kHz. Half-period of this frequency corresponds with confidence to time delay between ECE signals on internal and external side of magnetic surface and also to time of the temperature fault and the duration of HF plasma oscillations in internal disruption. Natural frequency was found also by means of magnetic probes and the cyclic generation of high energy electrons. The observing modulation of ECE and SXR signals characterizes just an oscillating process and can not be explain by the model with rotating "magnetic island". The existence of natural frequencies does not follow from "kink model".

Oscillations of current density including excited by small net frequencies in power supply play essential role in mutual concordance of the different modulated frequencies. Set of peculiarities give possibility to believe that ground of process are the cylindrical current density oscillations in mode m=0.