CO- AND COUNTER-PELLET-INJECTION into T-10 tokamak

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In the study of transport processes and the high temperature plasma confinement modes considerable attention given on areas with large temperature and concentration gradients, which in turn give rise of strong radial electric field and increase the shear of the poloidal rotation, which leads to suppression of certain radial transport mechanisms [1–3].

To form regions with a strong density gradient using pellet injection it should be provided prolonged and intense evaporation of pellets near the same magnetic surface. This situation occurs in the case of off-center pellet injection - by chord in the poloidal or tangential direction.

It was developed a chord injection system for T-10 tokamak, which is installed at the diagonal port + 30° (port of the hydrogen pellet injector) and allows to deflect the injected pellets on a predetermined angle in the vertical plane. This allows injections with the impact parameter in the range of –ri to +ri, where ri is the radius for maximum deviation of pellets, approximately corresponding to the radius of the last closed magnetic surface. The sign of the impact parameter determines the relative direction of injection and poloidal rotation. Minus corresponds to the injection in the direction against the poloidal rotation (in the case of counter-pellet injection), and the positive values ​​of the impact parameter corresponds to co-pellet injection.

In May 2016 on the tokamak T-10 were carried out the first experiments using the chord pellet injection system. Injections were carried out along the central chord, i.e. as they are performed before, and using the deviation of pellets on a half of minor radius and the maximum value. Part of injections carried out into an ECRH plasma.

Experiments have shown longer spike of Dα line in the case of injection along the peripheral chord in comparison with the central injection.

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References

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