

Study of argon impurity transport by X-ray imaging crystal spectrometer on J-TEXT

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Abstract

A tangential X-ray imaging crystal spectrometer (XICS) has been upgraded on J-TEXT tokamak to measure the electron/ion temperature and the plasma toroidal rotation velocity. The XICS has been designed to receive emissions of Ar XVII from -13 cm to +13 cm region with a spatial resolution of 1.8 cm in the vertical direction. The temporal evolution of argon impurity density profiles after an argon gas puff could be observed with a time resolution of up to 2 ms. The emissions of Ar XVII can be modulated by the resonant magnetic perturbations (RMPs) which indicates that the transport of argon is affected by the RMPs significantly. The 2/1 RMPs can lead to field penetration with enough RMPs amplitude. The XICS provides a tool for the study of the transport of argon impurities during the penetration of RMPs. During the field penetration phase, the emissions of Ar XVII decreased. The phenomena show that the transport of argon impurity at $r/a \sim 0.5$ has been enhanced during the field penetration phase. STRAHL can give the ratio between D and v profiles for the argon. The result shows that the argon is moving towards the edge by the diffusion.

[1] W. Jin et al 2014 Rev. Sci. Instrum 85 023509

[2] A. Langenberg et al 2017 Nucl. Fusion 57 086013

[3] Joohwan Hong et al 2017 Nucl. Fusion 57 036028

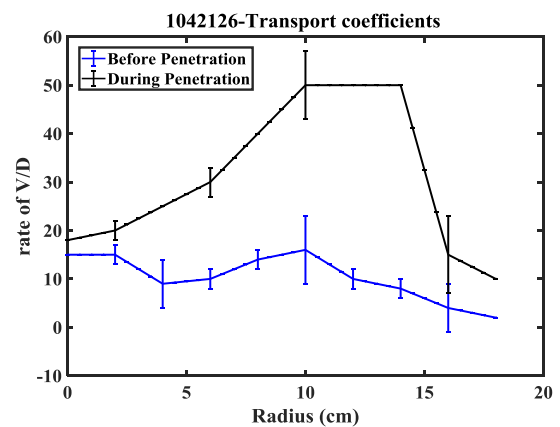


Fig.1 Inferred diffusive D and convective v transport coefficients for the argon transport by STRAHL

References

Note: Abstract should be in 1 page.