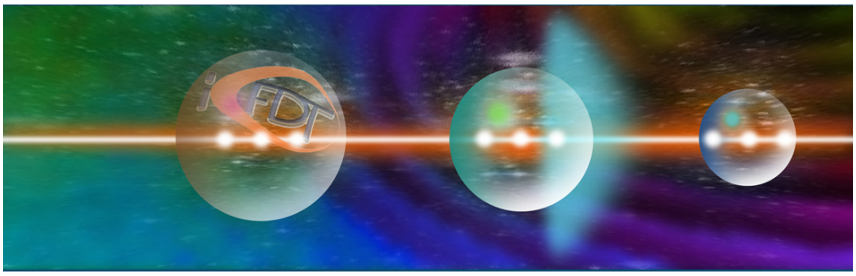

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# Low Temperature Kinetic Model of Collective Thomson Scattering and its relevance to the measurements of ion features in fusion reactors

*Thursday, 4 October 2018 14:30 (1h 30m)*

The low temperature kinetic model was introduced in the context of interpretation of Collective Thomson Scattering measurements. The key hypothesis of the model is related to the physical as- sumption that in the context of unmagnetised plasma the phase velocity of the plasma fluctuations which scatter the incident beam is higher than the thermal velocity of the electrons. The physics scheme considered is that in practice the electrons scatter the incident light and the ion feature emerges from the influence of the ion dynamics on the fluctuation of the electron density. In mag- netised plasmas [1,2,3] this assumption is specialised in separating the parallel from the perpendicu- lar ( to the toroidal magnetic field) dynamics ( v||el is the parallel electron velocity; v||phase is the parallel phase velocity of the fluctuation; K_perp is the component of the scattering K-vector=Ki- Ks, Ki,s=wave vectors of incident and scattered waves, perpendicular to the magnetic field ; rho_perp is the perpendicular electron Larmor radius ) : (i) v||el / v||phase «1 , and (ii) K_perp * rho_perp «1. It is possible that in geometries where the angle between the scattering plane , defined by the incident and scattered light K-vectors, and the toroidal magnetic field is close to the 90deg:in this case v||el / v||phase >1 and the approximation (i) is not precisely verified. The paper develops the analysis of the validity of the assumptions of the Collective Scattering models elabo- rated so-far in geometries and plasma parameters relevant for fusion reactors, like ITER and DEMO considering possible alternative approximations and comparing them with the rigorous solutions of the Thomson scattering theory.

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## Summary

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