

Seminar

Institute for Plasma Research

Title : Formation of collisional sheath in multicomponent plasma

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Date : 27th January 2017 (Friday)

Time : 03.30 PM

Venue : Seminar Hall, IPR

Abstract :

The ion-neutral collision plays an important role in the formation of sheath near inserted objects in plasma. The weakly ionized low pressure plasma contains a lot of neutral atoms which tend to reduce the ion motion while sheath formation and starts depositing the space charges much early in the space coordinate. This in turn modifies the near neighbourhood of the wall. Beside the presence of only electrons and ions, plasma may contain several other species namely, negative ions, dust particles or sometime two and more species of positive ions. The plasma of such type is termed as multicomponent plasma. The study finds out the criteria of sheath formation under the multicomponent environment of plasma. The emphasis will be on the presence of the negative ions and dust particles. The effect of collision on the near neighbourhood of dust particles will also be discussed.

The study aims at viewing the sheath formation in the pre-sheath scale, thereby taking no a priori assumption at the sheath edge. The presence of ion neutral collision creates a competition between the collision and the electric field to form the sheath. The validity of the Bohm criterion is in the regime where the electric field is solely responsible for the sheath to form. On the other hand the collision driven sheath formation leads to form the sheath even at subsonic speed. The variation of these and several other phenomena at different levels of ion-neutral collision under the multicomponent environment will be discussed.
