An experimental set-up to study non-radiative collisional processes relevant to fusion edge plasmas using low energy ion and electron impact

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Abstract

It is the era to search for the alternative to conventional source of energy. It was Albert Einstein who established the mass-energy equivalence that opened the window to think about the application of peaceful nuclear energy. Worldwide there are several fusion program going on in which DT reaction is confined either by magnetic or inertial confinement. There are numerous reactions taking place when the plasma particles interact with the wall of the reactor. Non-radiative collisional processes play vital role in the understanding of the various mechanisms in edge plasma boundary. Tungsten is suited as the best candidate for the wall material in fusion devices and for radiadtive cooling inert gases are supposed to circulate in diverter region.

In view of the above, we have developed an experimental set-up using time of flight mass spectrometry to investigate the non-radiative atomic and molecular processes relevant to fusion edge plasma using low energy ion as well as electron impact. Low energy N_2^+ ion beam produced from Coluron ion source is allowed to interact with tungsten surface and we found the formation of tungsten nitride layer on the surface of the tungsten surface [1, 2]. In addition, we investigate the collision of keV electron beam with neutral Argon gas which led the formation of multiply charged Argon ions [3-6].

The details of the experimental work with theoretical comparison will be presented and discussed.

References:

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