

Impact of gas puff fuelling on kinetic energy of Aditya-U tokamak plasma

Abstract

Gas puff is introduced in controlled manner into the plasma at the flat-top of plasma current to maintain plasma density at some plateau and so this is a fuelling process. It has been found beneficial for suppression of hard X-ray (HXR), magneto-hydrodynamic (MHD) instabilities etc. It is also judiciously used to reduce the heat loads on plasma facing components (PFC) during plasma disruption.

As a direct impact of the controlled Hydrogen gas fuelling, the averaged density and temperature of plasma are noticed to enhance. Consequently, the stored kinetic energy of the plasma is also impacted by the gas puffing and this has been reported in our previous work [1]. In Aditya-U plasma, the plasma of hydrogen or deuterium gas is prepared and either of them is introduced during controlled gas fuelling. The present work is aimed to study the impact of controlled gas fuelling on several plasma parameters, including the stored energy, diamagnetic nature of plasma etc. Several experimental conditions will be addressed to have a deeper insight about the dependency of kinetic energy of plasma on various experimental conditions.

[1] "Design and measurements of the diamagnetic loop in Aditya-U tokamak", Suman Aich et al, Radiation Effects and Defects in Solids, DOI: 10.1080/10420150.2024.2378424

Academic Project Requirements:

1) Required No. of student(s) for academic project: 1

2) Name of course with branch/discipline: B.Sc. Physics

3) Academic Project duration:

(a) Total academic project duration: 18 Weeks

(b) Student's presence at IPR for academic project work: 1 Full working Days per week

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