Estimation of the Hard X-ray signal for the scintillator detector

Abstract

The tokamak plasma is generated and sustained by the externally supplied electric field, which not only maintains the steady plasma current but also contributes to the plasma temperature rise. The plasma particles accelerate under this electric field and emit electromagnetic waves. A minority population of electrons experiences unlimited acceleration and minimal momentum cross-section transfer. This allows the electron to retain the energy achieved and eventually overcomes the magnetic confinement, running away. Such electrons are referred to as non-thermal electrons (NTE). The NTE slows down in the tokamak armour/ plasma facing components and hence emits X-rays (can be as high as a few tens of MeV). The NTE is very important to study for stable nuclear fusion reactions. The Study of RE is done by measuring these Hard X-rays. Generally,CsI, and LaBr3 scintillator detectors are being employed for the task. NTE is a wide-band source of X-rays; The project is to calculate the Hard X-ray signal generated by the Hard X-ray scintillator detector for different plasma conditions.

Academic Project Requirements:

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

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

3) Academic Project duration:

(a) Total academic project duration: 16 Weeks
(b) Student's presence at IPR for academic project work: 1 Full working Days per week

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