

Proposal Code : PDF-PlasmaDiag-0002	
Title	Estimation of the X-ray detector response matrix for cross detector operations.
Abstract	<p>The high-temperature and density tokamak plasma is a radiation source spanning a wide band of energies. Mostly, these radiations are bremsstrahlung in nature due to the acceleration and deceleration of the plasma particles. The localized bremsstrahlung radiation is a valuable source of information about the tokamak plasma, especially at the X-ray band. Because this will be carrying the information of the plasma core. Such radiation also senses the fluctuation in the plasma and is helpful in determining the plasma shape, too. A sizable amount of the line radiation is also available. The line radiation, at lower energies few eVs to tens of keV, gives information about the impurity dynamics of the plasma. Therefore, proper measurement of such radiation is paramount for any tokamak operation. The radiation measurements are carried out by the radiation detectors, which convert the radiation into proper electrical signals that are processed to extract different aspects of the tokamak plasma. Every detector has its own characteristic; however, a unified detector is not available. By computer simulation, a unified detector response matrix can be achieved in order to improve the interoperability of the detectors. The project objective is to achieve the response matrix for interoperability. This matrix will help in understanding the data across different detectors.</p>
Research Focus Areas	<p>Presently, IPR is involved in different types of tokamak experiments, ADITYA-U, SST and forthcoming SST-Bharat. These tokamaks are/and expected to have fast particles, which are one of the key sources of X-ray radiation. These radiations cannot be measured by a single detector. Therefore, a unified detector response matrix will be helpful to improve the interoperability within the detectors. Such activities are in line with the ongoing efforts in upgrading the radiation diagnostic in IPR.</p>
Qualifications	PhD in Physics
Desired Experience	Experience in handling radiation detector and computer modeling would be desirable.
Other remarks	