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14.28 Tomographic reconstruction of AXUV radiations during disruptions on J-TEXT

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Multi-channel absolute extreme ultraviolet (AXUV) photodiodes array diagnostic system has been installed to measure the radiations in a wide spectral range on J-TEXT tokamak. It is dedicated for the studying of the radiation during the thermal quench phase in the disruptions caused by Massive Gas Injection (MGI). A standard method for deriving the local emissivity profiles of the plasma from the line-of-sight integrals measured by AXUV detectors is tomographic inversion. Such an inversion is challenging due to its ill-conditioned nature. Besides the accuracy of reconstruction profiles depends not only on the quality and quantity of data measured but also on the tomography algorithm. In this study, the space-time tomography algorithm was developed for J-TEXT plasmas by using Maximum Entropy method and finite element analysis method to obtain a more precise interpretation during the scenario of Massive Gas Injection. The feasibility and deviation of modified algorithm was verified. Finally, typical shots have been analyzed in detail by optimized two-dimensional image reconstruction, illustrating credibly spatial evolution of radiation power profiles and featuring poloidal asymmetric impurity distributions on J-TEXT tokamak.

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