9th Asia-Pacific Conference on Plasma Physics, 21-26 Sep, 2025 at Fukuoka

Plasma electron density profile tomography for EAST based on integrated data analysis

Zijie Liu[1]

[1] Institute of Energy, Hefei Comprehensive National Science Center

E-mail: zijie.liu@ipp.ac.cn

Abstract:

Plasma electron density is a crucial parameter in plasma studies. Accurately inverting the plasma electron density profile is vital for plasma control experiments and the investigation of plasma physical mechanisms. This paper proposes an integrated data analysis (IDA) method based on Bayesian inference, which integrates polarimetric interferometry, hydrogen cyanide laser interferometer, and microwave reflectometer diagnostics for inverting the plasma electron density profile. To enhance inversion accuracy, a Gaussian prior probability of the non-stationary hyperparameter is used. This prior probability effectively simulates situations where there is a large plasma electron density gradient in the pedestal, especially under the condition of high-confinement mode discharge. Compared to the use of Gaussian prior probability for the stationary hyperparameter, the proposed IDA method based on the non-stationary hyperparameter prior probability achieves higher inversion accuracy.