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Bayesian modelling of multiple diagnostics at Wendelstein 7-X using the Minerva framework SEHYUN KWAK, Korea Adv Inst of Sci Tech , JAKOB SVENSSON, SERGEY BOZHENKOV, HUMBERTO TRIMINO MORA, UDO HOEFEL, ANDREA PAVONE, MACIEJ KRYCHOWIAK, ANDREAS LANGENBERG, Max-Planck-Institut fr Plasmaphysik, YOUNG-CHUL GHIM, Korea Adv Inst of Sci Tech, W7-X TEAM TEAM — Wendelstein 7-X (W7-X) is a large scale optimised stellarator designed for steady-state operation with fusion reactor relevant conditions. Consistent inference of physics parameters and their associated uncertainties requires the capability to handle the complexity of the entire system, including physics models of multiple diagnostics. A Bayesian model has been developed in the Minerva framework to infer electron temperature and density profiles from multiple diagnostics in a consistent way. Here, the physics models predict the data of multiple diagnostics in a joint Bayesian analysis. The electron temperature and density profiles are modelled by Gaussian processes with hyperparameters. Markov chain Monte Carlo methods explore the full posterior of electron temperature and density profiles as well as possible combinations of hyperparameters and calibration factors. This results in a profile inference with proper uncertainties reflecting both statistical error and the automatic calibration for diagnostics.

Sehyun Kwak
Korea Adv Inst of Sci
Tech

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