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Bayesian Gaussian Process Tomography of W7-X bolometers using the Minerva framework JAKOB SVENSSON, DAIHONG ZHANG, Max Planck Institute for Plasma Physics, Greifswald — We develop a new Bayesian tomographic method based on Gaussian processes (Gaussian Process Tomography, GPT) where the model complexity is adjusted automatically, varying between 1D flux surface constancy and full 2D using a Bayesian Occam's razor criteria. The GPT method for non-flux surface constrained tomography has been prevously developed and used for soft x-ray, bolometer, interferometer and current tomography problems. In this paper we present an extension of this method which allows for a probabilistic flux surface constraint, that finds the most probable underlying complexity of the emission distribution. The distribution is defined in 2D flux coordinates, where the poloidal coordinate is described by a periodic Gaussian process. As with the standard GPT method, this method also gives uncertainties of the tomographic reconstruction that includes uncertainties both from measurements and from intrinsic ambiguities of the ill-posed tomography problem. The method has been applied to the bolometer system for the first experimental phase of W7-X and results will be shown here. The model has been implemented in the Minerva Bayesian modeling framework, which is used for a number of W7-X diagnostics.

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