

Bayesian Approaches to Uncertainty Quantification in plasma-wall interaction modelling

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Computer models play a crucial role in providing insight in complex systems. Increasingly the need for verification, validation and uncertainty quantification of computer simulations has become evident. We discuss uncertainty estimates and approaches to uncertainty estimation in plasma-wall interaction with particular attention to hydrogen transport in tungsten and erosion in mixed-material systems.

On the theoretical side closed-loop optimal experimental design algorithms provide a key component for the extension of Uncertainty Quantification (UQ) to higher dimensional settings. Here, we will present an approach for a closed-loop experimental design .

However, in practice the main shortcomings are rarely dictated by limited computational power but more often by the inadvertently use of inadequate models. Examples for that will be given as well as possible approaches to alleviate the problem.