Advanced analysis methods for SXR diagnostics: tomography

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As an example of advanced analysis techniques for SXR diagnostics, tomographic reconstruction of emission profiles from a number of line-integral measurements will be discussed. The presentation will be a practical guide to the design of tomography diagnostics in the environment of fusion experiments and to the application of tomography algorithms.
Import aspects that need to be considered in the design of tomography diagnostics and application of tomography algorithms are constraints on fusion experiments and theoretical aspects of algorithms. The consequences for design and key considerations for practical implementation of algorithms will be discussed. A detailed review of this topic has already been published as reference [1]. The aim of the presentation is to give easy-to-understand, insight-generating examples of abstract mathematical concepts, such as regularization, discretization and basis function representation, as well as providing understanding of the key aspects of commonly applied algorithms.
Examples of the application of SXR tomography will be shown. The same considerations and mathematical methodologies can also be applied to a range of other plasma diagnostics. Furthermore, the mathematical methodologies share similarities with those used for, for example, deconvolution and image processing.

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[1] Ingesson L C et al. 2008 Fusion Sci. Technol. 53 528