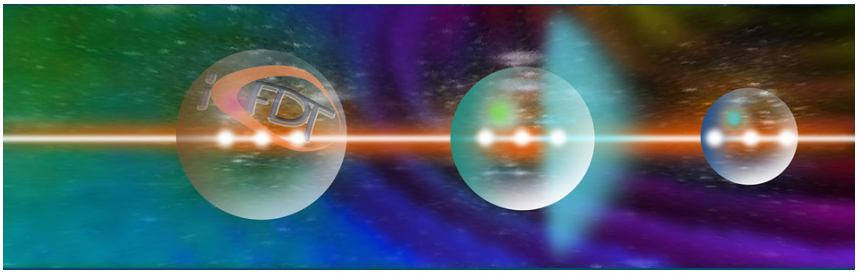

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Approximate solutions of polarization state evolution in tokamak plasma polarimetry and their precision

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Polarimetry measurement results are used in tokamak plasma equilibrium codes as a constraint, decreasing the measurement uncertainty in determination plasma current, safety factor and density profile. In numerical codes, instead of solving rigorous equation of polarimetric state evolution, approximate analytical expression could be used to increase computing efficiency. In this paper is analysed the precision of three different models compared with exact solution of evolution equation for angular variables (ψ,δ). Calculations are made for circular plasma model, with a wide variety of plasma conditions, representative for the JET operating domain. The limits of applicability of these approximations, due to the accuracy of the Faraday rotation and Cotton-Mouton angle value approximation, are estimated. The obtained results define the limits of applicability of the proposed methods in equilibrium codes for plasma in configuration considered in the paper.

Summary

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