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2.19 Self-calibrating techniques for polarimetric Thomson scattering

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Polarimetric Thomson scattering (TS) is a diagnostic technique useful to increase the accuracy of T_e and n_e measurements in very hot fusion plasmas such as those of ITER. As for conventional TS the calibration of a polarimetric TS detection system can be performed by using a radiation source internal to the vacuum chamber or, alternatively, Raman scattering from N₂ gas filling the vacuum vessel. These calibration methods are thought to be too invasive in case of a large fusion experiment and therefore for conventional TS measurements in ITER self-calibrating techniques have been proposed by which, using two laser pulses of different wavelength, the spectral sensitivity of the detection system can be continuously monitored during the experimental campaigns, without the need of invasive internal sources. In this paper we extend the concept of self-calibrating measurements to the polarimetric TS technique too. By exploiting the polarization properties of TS scattering light and two laser pulses of different polarization, we show that self-calibrating measurements are possible also for a TS detection system including polarimetric measurements and indicate simple methods for its implementation.

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