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4.30 Means of alignment observation and evaluation integrated into plasma diagnostics based on Thomson scattering

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In order to ensure proper operation of plasma diagnostics based on Thomson scattering (TS), precise adjustment and proper alignment of both the laser beam path and the collection optics of scattered light is of great importance to provide reliable and accurate measurements. Misalignment, permanent or intermittent, could result in incorrectly determined plasma (electron) density or even prevent the usability of this type of diagnostic at all. Therefore, suitable means of alignment monitoring should be integrated into each TS diagnostic system. One of the methods commonly used for alignment observation consists in an individual evaluation of signals obtained from a given fiber bundle split in halves. The ratio of corresponding intensities serves as a suitable tool. This work presents variations of the method based on this principle. Correlation of acquired intensity ratios with the performed measurements of vibrations of the TS collection optics structure on the COMPASS tokamak is discussed. Various techniques of optimization of alignment monitoring are shown. The optimal technique, which could be accommodated during construction of TS diagnostic systems on future fusion devices, is proposed.

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