

Integration of an dispersion interferometer at TEXTOR: Analysis with respect to operational and safety relevant issues

H.T. Lambertz¹, W. Biel¹, B. Schweer¹, J. Thomas¹, G. Esser¹, H. Dreier², P. Bagryansky³, A.D. Khilchenko, Yu. V. Kovalenko³, A. Lizunov³, A. Solomakhin³

¹ Institute of Energy Research - Plasma Physics, Forschungszentrum Jülich GmbH, EURATOM Association, EURATOM-FZJ, D52425 Jülich, Germany, <http://www.fz-juelich.de/fusion>

² Max-Planck-Institute for Plasma Physics, EURATOM Association, 17491 Greifswald, Germany

³ Budker Institute of Nuclear Physics, Prospect Lavrentieva 11, 630090 Novosibirsk, Russia

Corresponding author: H.T.Lambertz@FZ-Juelich.de

Today's fusion experiments are often determinate by international cooperation's – ITER is the most prominent example, but even at currently running experiments one can find contributions from external partners in the fields of knowledge and hardware. However, from the technical point of view, the integration of external components into an existing system may become challenging due to different standards in techniques, safety and other related topics.

In this paper the integration of a dispersion interferometer, developed by the Budker Institute of Nuclear Physics (BINP), Novosibirsk, into the environment of the TEXTOR tokamak at the Forschungszentrum Jülich (FZJ), Germany, will be described in detail. The interferometer is a modular diagnostic for the measurement of the line-integrated density and is intended to be a regular machine diagnostic for density and plasma position control. For this, an excellent performance, a high reliability and a complete integration into the TEXTOR control system is mandatory.

The control system is based on Siemens S7 PLC hardware and Siemens WinCC visualization software and is designed for modular operation, i.e. the possibility to operate the different interferometry channels independently. The concept of control and data acquisition will be presented.

Special attention will be paid to the transformation of the safety relevant components (e.g. laser safety, personal safety) from a prototype diagnostic to a push-button measurement system, fulfilling national and European safety standards (ISO norm). The paper will conclude some remarks about the general strategy for comparable projects.