First exploitation results of recently developed SXR GEM-based diagnostics at the WEST project

M. Chernyshova\textsuperscript{a}, D. Mazon\textsuperscript{b}, T. Czarski\textsuperscript{a}, K. Malinowski\textsuperscript{a}, A. Wojeński\textsuperscript{a}, P. Malard\textsuperscript{b}, E. Kowalska-Strzęciwilk\textsuperscript{a}, K.T. Poźniak\textsuperscript{a}, G. Kasprówicz\textsuperscript{c}, W. Zabolotny\textsuperscript{e}, R.D. Krawczyk\textsuperscript{c,d}, P. Kołasiński\textsuperscript{e}, M. Gąska\textsuperscript{e}, P. Linczuk\textsuperscript{e}, and the WEST team\textsuperscript{e}

\textsuperscript{a} Institute of Plasma Physics and Laser Microfusion, Hery 23, 01-497 Warsaw, Poland
\textsuperscript{b} CEA, IRFM, F-13108 Saint-Paul-lez-Durance, France
\textsuperscript{c} Warsaw University of Technology, Institute of Electronic Systems, Nowowiejska 15/19, 00-665 Warsaw, Poland
\textsuperscript{d} CERN, 1211 Geneva 23, Switzerland
\textsuperscript{e} http://west.cea.fr/WESTteam

maryna.chernyshova@ipplm.pl

One of the tasks associated with the study of plasma wall interaction in tokamaks, is to study the process of the formation and behaviour of plasma contamination induced by this interaction. One has to note that plasma contamination can cause many instabilities and may even lead to the disruption of the plasma. Of a particular interest here is tungsten, which is to be used as divertor material in the ITER reactor. Basic information on impurities is, in general, obtained by studying linear emission of impurities. The solution of most contamination problems depends to a decisive degree on the knowledge of the dynamics of impurities emission in time and space (in the cross-section of the plasma).

X-ray spectroscopy used for this purpose is a recognized, effective and powerful tool in plasma diagnostics. It provides effective means for studies of W components erosion, consequences of it and material migration. The search for new technologies in the field of plasma diagnostics entails the increasing demands on the radiative stability of the used materials due to development and usage of fusion facilities, where the study of processes occurring during the interaction of radiation with matter has become particularly important. Currently, a new X-ray imaging detection technology is required for tokamaks such as ITER. X-ray detectors that are being used nowadays in existing equipment may rapidly degrade due to large neutron fluxes characteristic for the tokamak environment.

This contribution presents the development of the elaborated plasma imaging technology in the area of soft X-ray radiation (SXR), designed to monitor the radiation of impurities. This work will provide details of the developed diagnostics and preliminary results obtained within the commissioning phase at the WEST Project. It will be shown that both spatially and spectrally resolved calibrated data could be collected, as well as comparison with other WEST diagnostics will be presented. The system for the moment provides first measurements and records rather high part of the SXR which still could be very useful to testify about an intensification of the erosion (e.g. thanks to bremsstrahlung effect).\textsuperscript{1}

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