Study of the W vapor shielding layer radiation in EUV spectral range with temporal resolution

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During transient plasma events in ITER (ELMs and disruptions) vacuum chamber armour materials will be subjected to strong erosion. In experiments on plasma guns it was shown that the erosion is essentially reduced by the vapour shielding effect [1]. Appropriate theoretical models and experimental data are required to evaluate the influence of this effect on the armour materials resource [2]. In this work, a flat tungsten (W) target was irradiated with intense hydrogen plasma stream at the MKT pulsed plasma gun (SRC RF TRINITI, Troitsk) under conditions typical for ELMs and disruptions in ITER. The purpose of this work is to perform spectral study of the vapour shielding layer radiation in the spectral range of 5–70 nm. The transmission grating spectrograph and the fast EUV camera were used as the main diagnostic tools. To determine the ionic composition of the W plasma, the experimental spectra were compared with the ADAS database [3]. Evolution of the ionic composition of near-surface W plasma, it's expansion rate and thickness of the radiating W plasma layer were measured in the current work.

[1] Pitts R and et al 2013 *J. Nucl. Mater* **438** S48–S56
[2] Pestchanyi S and et al 2017 *Fusion Eng.* **124** 401–404
[3] Spectral database ADAS *URL: https://open.adas.ac.uk/*