## DOI: 10.34854/ICPAF.52.2025.1.1.019 ESTIMATION THE T-15MD TOKAMAK PLASMA BOUNDARY BASED ON THE VIDEO CAMERA IMAGES \*)

<sup>1</sup><u>Khrapov A.A.</u>, <sup>2</sup>Eliseev L.G., <sup>1,2</sup>Sarancha G.A., <sup>2</sup>Tolpegina Yu.I., <sup>2,3</sup>Ulasevich D.L.

<sup>1</sup>Moscow Institute of Physics and Technology (NRU), <u>info@mipt.ru</u> <sup>2</sup>NRC "Kurchatov Institute", <u>nrcki@nrcki.ru</u>

<sup>3</sup>NRNU "MEPhI", <u>info@mephi.ru</u>

Information about the position, size and shape of the plasma boundary is necessary both for solving the problems of tokamak discharge control and for studying the high-temperature plasma physics.

The main tools for determining the plasma boundary are electromagnetic diagnostics: loop voltage sensors and magnetic probes. However, their results interpretation is often complicated by various types of noises and electromagnetic interference. For this reason, the world's leading facilities: MAST and JET [1], TCV and Tore-Supra [2], EAST [3] and HL-2M [4] use additional data from high-speed video cameras that observing the plasma glow in the visible spectrum. This light carries information about the position of the cold plasma layer, which could be associated with the plasma boundary.

The T-15MD tokamak routinely uses a XIMEA CB120CG-CM-X8G3 overview video camera, shooting with a resolution up to 4096 x 3072 pixels at a speed of 500 fps. This paper presents an algorithm for processing frames to obtain information about the position of the magnetic axis, minor radius, elongation and triangularity of the plasma.

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Fig. 1. Image of discharge No2321 (left) and visible plasma boundary with  $R_0 = 1,25$  m, a = 0,2 m,  $\kappa = 1,0$  (right)

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