I&C DEVELOPMENT STATUS OF THE CHARGE EXCHANGE RECOMBINATION SPECTROSCOPY DIAGNOSTIC system [[1]](#footnote-1)\*)

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The Charge Exchange Recombination Spectroscopy (CXRS) diagnostic system will provide measurements of a large number of important physical quantities at the ITER facility by spectral analysis of the plasma shape. Obtained parameters are fundamental for plasma control and physical studies. The considered diagnostic system is at the final design stage and is being prepared for passing the Final Design Review validation. A number of requirements is imposed on the projects of the final design stage, aimed at obtaining a complete specification of all technical aspects of the measurement system and auxiliary subsystems. CXRS diagnostics includes the following subsystems: fiber bundle heating element control in the harsh environment in Interspace zone, first mirror shutter control for protection against exposure to plasma, fiber end alignment with the optical system to provide necessary for measurement running spatial resolution, first mirror surface cleaning from the impurity products of the plasma combustion, optical system and spectral equipment calibration. The presence of a large number of subsystems has a direct impact on the complexity of the data acquisition and control system design, its hardware architecture, as well as defining operating modes, interfaces and system states.

This paper presents solutions that meet the ITER requirements and that will serve as basis for the final design project, among them: high-level and detailed hardware architecture, software design of the I&C system, control cubicles configuration, detailed description of the diagnostics operating modes, control procedures and maintenance by technical personnel in accordance with the organization’s requirements.

References

1. Simrock S. Control system for ITER diagnostics, heating and current drive. // Fusion Engineering and Design. 2016. 112. P. 724-730.

1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/L/E/ru/KC-Nesterenko.docx) [↑](#footnote-ref-1)