

Design of Ultra-fast Charge eXchange Recombination Spectroscopy diagnostic on EAST tokamak

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A four-testing-channel Ultra-Fast Charge eXchange Recombination Spectroscopy (UF-CXRS) diagnostic is under developing on the EAST tokamak and a 128-channel upgraded one will be combined with the existing 128-channel Beam Emission Spectroscopy to diagnose plasma pressure. This diagnostic is based on the active charge exchange to measure ion temperature with a time resolution at the order of 1 μ s and a spatial resolution of 1 cm. The main component design and selection together with simulations and test results are presented in this report. The theoretical estimation of the emission photon flux which can reach the detector of UF-CXRS system has been carried out, proving the feasibility of the whole design.