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2.39 Radiation diagnostics for plasma current ramp-up and ramp-down research

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The plasma current ramp-up and ramp-down that are always along with strong instabilities are the unavoidable processes in the tokamak operation. In order to research these processes in SUNIST(Sino-UNIted Spherical Tokamak), some diagnostic systems that detect the plasma radiation ranging from hard X-rays to visible light are developed. CdZnTe and Silicon drift detectors measure the energy spectrum of hard X-rays and soft X-rays coming from different positions of the plasma. A pinhole camera equipped with an AXUV-16ELG array photodiodes has been installed on the top of SUNIST to observe the radiation power loss and the MHD activities with high temporal and spatial resolution. The spectrum of vacuum ultraviolet is acquired by CCD camera and the intensity of some lines can be measured by PMT with scintillator. The full spectrum of the visible light can be acquired in every 3ms, and the intensity of some lines, such as H_α, H_β can be measured by filter scopes with high time response. Additionally, a Doppler broadening measurement system is developed to measure the ion temperature of edge plasma.

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