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3-D soft-X ray imaging diagnostics for the study of MHD mode dynamics in RELAX AKIO SANPEI, SADAO MASAMUNE, KENSUKE OKI, DAISUKE FUKAHORI, KAZUAKI DEGUCHI, SEIYA NAKAKI, HARUHIKO HIMURA, Kyoto Institute of Technology, SATOSHI OHDACHI, National Institute for Fusion Science, NOBUHIRO NISHINO, Hiroshima University, TAKUMI ONCHI, University of Saskatchewan — In a low-A RFP machine RELAX ($R = 0.51$ m/$a = 0.25$ m ($A = 2$)), a quasi-periodic transition to quasi-single helicity (QSH) state has been observed in shallow-reversal discharge regions. During the QSH state, the fluctuation power is concentrated to the dominant $m = 1/n = 4$ mode. We have applied a SXR pin-hole camera and a ICCD camera to take tangential soft-X ray (SXR) images (snapshots) of the RFP during the QSH state, identifying characteristic helical SXR structures suggesting hot or dense helical core. As a next step, we have been developing a SXR imaging diagnostic system for 3-D structural studies. The system uses multiple SXR cameras together with high-speed cameras to take time-evolution of SXR images from tangential and vertical directions simultaneously for the study of dynamic structures of 3-D SXR emissivity, through which we expect to discuss 3-D dynamics of MHD instabilities associated with the QSH state in RELAX. Initial results will be reported, together with some discussion on 3-D reconstruction techniques.

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