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Evaluation of time evolution of 3-D Structure in RELAX RFP with SXR Imaging Technique AKIO SANPEI, SADAO MASAMUNE, KANAE NISHIMURA, RYOTA UEBA, GO ISHII, RYOSUKE KODERA, YOSUKE AOKI, HARUHIKO HIMURA, Kyoto Inst of Tech, SATOSHI OHDACHI, NAOKI MIZUGUCHI, TSUYOSHI AKIYAMA, National Institute for Fusion Science — 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. During the QSH state, the fluctuation power concentrates in the dominant m = 1/n = 4 mode, and a (toroidally rotating) 3-D helical structure has been observed with radial array of magnetic probes. We have applied a high-speed (10-microsecond time resolution) dual soft-X ray (SXR) imaging diagnostic system to take SXR images from tangential and vertical directions simultaneously to observe 3-D dynamic structures of the SXR emissivity. The magnetic field topology for the QSH RFP phase in RELAX plasmas are identified with obtained dual SXR images and results of external magnetic measurements. Recently, we have developed a two-dimensional electron temperature diagnostic system for thermal structure studies. The system consists of a SXR camera with two pin-holes for two-kinds of absorber foils, combined with a high-speed camera. We have succeeded in distinguishing Te image in QSH from that in multi-helicity (MH) RFP states. The most recent results using above techniques will be presented, together with discussion on possible reconstruction methods from 3-D imaging.

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