Abstract Submitted
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Development of ultra-fast 2D ion Doppler tomography using image intensified CMOS fast camera[1] HIROSHI TANABE, AKIHIRO KUWAHATA, HARUKI YAMANAKA, MICHIAKI INOMOTO, YASUSHI ONO, Univ.Tokyo, TS-GROUP TEAM — The world fastest novel time-resolved 2D ion Doppler tomography diagnostics has been developed using fast camera with high-speed gated image intensifier (frame rate: 200kfps. phosphor decay time: $\sim$ 1μs). Time evolution of line-integrated spectra are diffracted from a f=1m, F/8.3 and g=2400L/mm Czerny-Turner polychromator, whose output is intensified and recorded to a high-speed camera with spectral resolution of $\sim$0.005nm/pixel. The system can accommodate up to 36 (9$\times$4) spatial points recorded at 5μs time resolution, tomographic reconstruction is applied for the line-integrated spectra, time-resolved (5μs/frame) local 2D ion temperature measurement has been achieved without any assumption of shot repeatability. Ion heating during intermittent reconnection event which tends to happen during high guide field merging tokamak was measured around diffusion region in UTST. The measured 2D profile shows ion heating inside the acceleration channel of reconnection outflow jet, stagnation point and downstream region where reconnected field forms thick closed flux surface as in MAST. Achieved maximum ion temperature increases as a function of B_{rec}^2 and shows good fit with MAST experiment, demonstrating promising CS-less startup scenario for spherical tokamak.

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