

Spectrally Filtered Fast Imaging of Internal MHD Activity in the DIII-D Tokamak

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Broadband visible Bremsstrahlung emission from the core of the DIII-D tokamak has been imaged using a fast framing (26k frames/s) camera with resolution of 256 x 256 pixels and record lengths up to 22k frames. The three-dimensional data set allows spectral analysis of the time series of individual pixels, which is used to reconstruct images of the amplitude and phase of internal MHD modes in the plasma. Application of this spectrally-filtered fast imaging (SFFI) technique reveals spatially extended coherent structures that correspond to internal MHD modes rotating in the laboratory frame. The detailed poloidal structure of an $m/n = 2/1$ Neoclassical Tearing Mode has been obtained and is in excellent agreement with modeling. Extension of SFFI to other MHD events and coherent fluctuations is straightforward and could lead to further understanding of core activity in fusion devices.

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