Abstract Submitted
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Design of a phase contrast imaging diagnostic for the Wendelstein 7-X stellarator[1] E. M. EDLUND, M. PORKOLAB, MIT Plasma Science and Fusion Center, O. GRULKE, L.-G. BÖTTGER, C. SEHREN, Max Planck Institute for Plasma Physics, Greifswald — The Wendelstein 7-X stellarator at IPP Greifswald commenced operation in 2015, and while its design has been aimed at minimizing neoclassical transport, turbulent transport is expected to be strongly affected by the magnetic geometry. With this in mind, MIT and IPP-Greifswald scientists have undertaken a project to design and implement a phase contrast imaging (PCI) diagnostic to measure turbulence in W7-X in the OP1.2 operating phase starting in 2017. The principle and design aspects of the PCI method have been described in numerous past publications [1,2]. In W7-X the PCI system will have two imaging systems differing only in the angle of the spatial mask that selects for magnetic pitch angle, and will produce measurements of poloidal and radial correlations. A series of remotely controllable optics will allow the beam size and image magnification to be adjustable. We expect sensitivity to fluctuations in the range of 2 kHz to approximately 2 MHz and wavenumbers in the range of 1 cm^{-1} to 30 cm^{-1} which should allow us to detect ITG, TEM and possibly ETG turbulence.
[1] M. Porkolab et al, IEEE Trans. Plasma Sci. 34, 229 (2006).
[2] J. Dorris et al, Rev. Sci. Instrum. 80, 023503 (2009).

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