

Abstract Submitted
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Physics and Engineering of the Gas-Puff Imaging Diagnostic for W7-X¹ J.L. TERRY, S.G. BAEK, S.B. BALLINGER, MIT-PSFC, A. VON STECHOW, O. GRULKE, C. VON SEHREN, Max-Planck-Institut für Plasmaphysik, W7-X TEAM — A Gas Puff Imaging diagnostic is being installed on the Wendelstein 7-X Stellarator. It will be commissioned at the start of the next run campaign. The diagnostic will measure the 2d structure and dynamics of plasma fluctuations in a 75x40 mm region near the outboard boundary. In the “standard” magnetic configuration, the field-of-view will span (radially) one of the 5 magnetic islands at the boundary, thereby interrogating some of the turbulence dynamics at the island. The field-of-view will also include the last closed flux surface in some magnetic configurations. We expect a spatial resolution of ≈ 5 mm within the field-of-view. The engineering of the system is challenging and features a number of innovative elements. The local gas puff (H_2 or He) used to “illuminate” the plasma fluctuations is provided by two “converging-diverging” nozzles that collimate the gas cloud to a half-angle of $\approx 12^\circ$. The emission from the gas cloud’s interaction with the plasma is gathered by a high-throughput re-entrant lens system inserted in a port adjacent to the gas-puff port. It features a pop-up mirror that turns the view through a 115° angle and acts as a shutter for the mirror and optics when retracted.

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