

Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Turbulence studies in NBI heated discharges by the Phase Contrast Imaging diagnostic in the Wendelstein 7-X stellarator¹ ZHOUJI HUANG, MIT Plasma Science and Fusion Center, Cambridge, MA, USA, ERIC EDLUND, SUNY Cortland, Cortland, NY, USA, MIKLOS PORKOLAB, MIT Plasma Science and Fusion Center, Cambridge, MA, USA, ADRIAN VON STECHOW, JAN-PETER BHNER, OLAF GRULKE, Max-Planck-Institut fr Plasma-physik, Greifswald, Germany, THE W7-X TEAM — A phase contrast imaging (PCI) diagnostic has been implemented on the Wendelstein 7-X (W7-X) stellarator to measure line-integrated, ion-scale density fluctuations with the aim of studying plasma turbulence, which is expected to be the major loss channel of particles and energy compared to the reduced neoclassical transport. In the recent operational campaign, a limit of core ion temperature has been observed under a wide range of plasma parameters. In contrast to pellet fuelled and ECH heated discharges, pure neutral beam injection (NBI) shows no significant rise of the ion temperature, in spite of a strongly peaked density profile that develops in the core plasma with increasing density. The PCI measurements show that the absolute density fluctuation amplitude remains nearly unchanged during NBI. Introducing additional low power ECH can lead to a transient increase of the ion temperature. A low frequency mode can be observed by PCI in this transient phase.

¹Work supported by US DOE Grant DE-SC0014229. This work has been carried out within the framework of the EUROfusion Consortium and has received funding from the Euratom research and training programme 2014-2018 and 2019-2020 under grant agreement No 633053.

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Date submitted: 29 Jun 2020

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