

Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Parameter Dependencies of the Configuration-Dependent 1-2 kHz Fluctuation in W7-X¹ SEAN BALLINGER, JAMES TERRY, SEUNG-GYOU BAEK, MIT PSFC, ADRIAN VON STECHOW, CARSTEN KILLER, KIAN RAHBARNIA, JONATHAN SCHILLING, HENNING THOMSEN, IPP Greifswald, GLEN WURDEN, LANL, OLAF GRULKE, IPP Greifswald, DTU, W7-X TEAM — A 1-2 kHz electromagnetic fluctuation is present in a large fraction of W7-X discharges that are produced in the magnetic field configuration with iota 0.97 at the last closed flux surface and 5/5 island structure. This fluctuation, first observed as a quasi-coherent modulation in visible light from the divertor, was found to be present in signals from a number of diagnostics including line-integrated density, diamagnetic energy, edge electron temperature, floating potential, and divertor tile temperature. It occurs during steady-state operation and is not present in other magnetic configurations, some of which have signature fluctuations below 1 kHz. In this study, a survey of extensive Mirnov coil data sheds light on the plasma parameters related to the occurrence and attributes of the 1-2 kHz fluctuation. Toroidal current is positively correlated with the fluctuation's frequency and power, and the fluctuation power increases with ECRH power and decreases with plasma density. Finally, the mode structure and radial extent are studied using data from Mirnov coils and Langmuir probes.

¹This work was supported by US DoE award DE-SC0014251.

Sean Ballinger
MIT PSFC

Date submitted: 02 Jul 2019

Electronic form version 1.4