

Status of the US W7-X collaboration 2018

David A. Gates
October 1, 2018

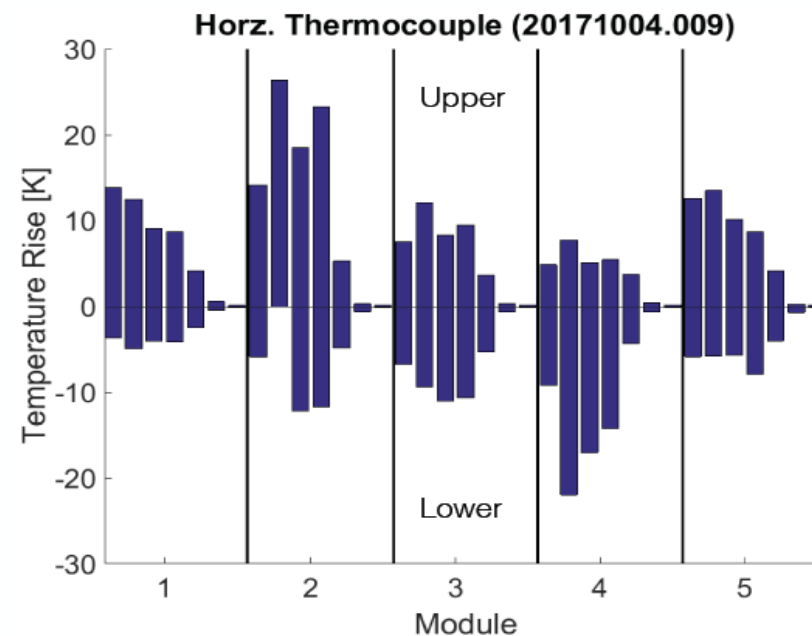
W7-X 2018 notable outcome has been met

- Trim coils used to balance heat flux in the divertor
- Data compared to heat flux diffusion model
- Draft result submitted to W7-X publication approval process
 - will be submitted to PPCF (“*Error Fields in Stellarators*”, Lazerson, *et al.*)

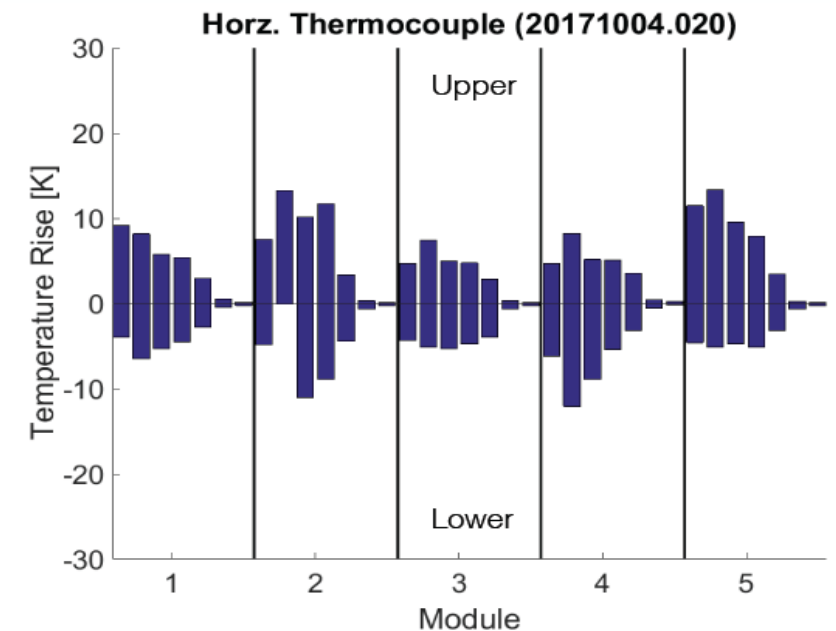
FY 2018 Notable Outcome: *Develop and utilize predictive models of the changes in the heat flux distribution induced by the U.S.-supplied trim coils in the Wendelstein 7-X island divertor. Compare the model results to data obtained in experiments during OPl.2.*

Error field correction of standard configuration

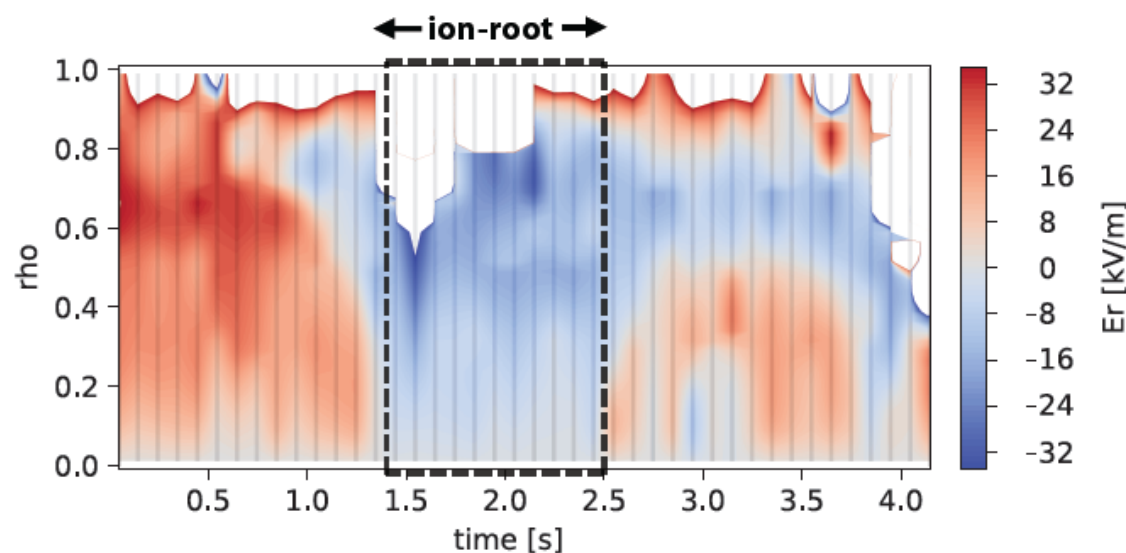
Before Correction



After Correction



FIRST EXPERIMENTAL MEASUREMENTS OF ION-ROOT PLASMAS ON WENDELSTEIN 7-X

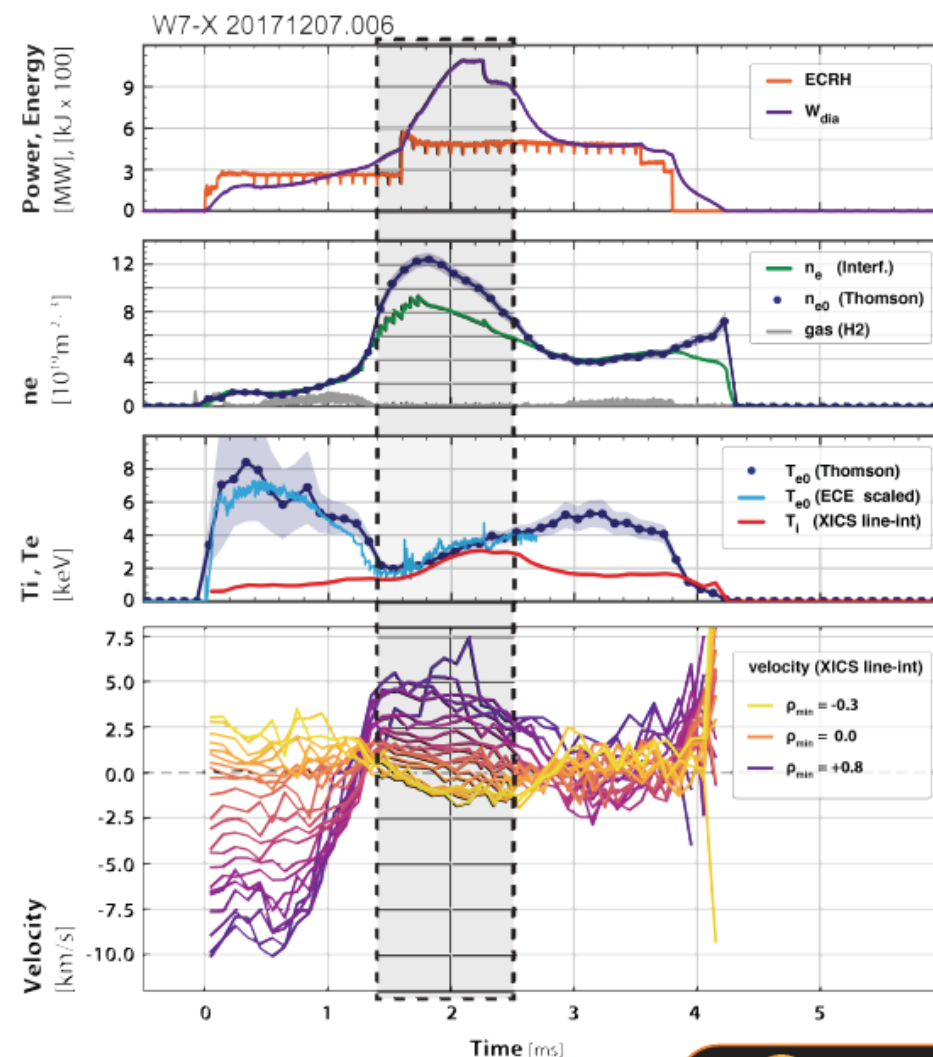


First measurements of the ion-root in W7-X plasmas made possible by XICS diagnostic.

- negative radial electric field \rightarrow ion-root

The W7-X design is optimized for reduced neoclassical energy transport at high density in the ion-root.

- This measurement is an important step in evaluating the effectiveness of the W7-X optimization.



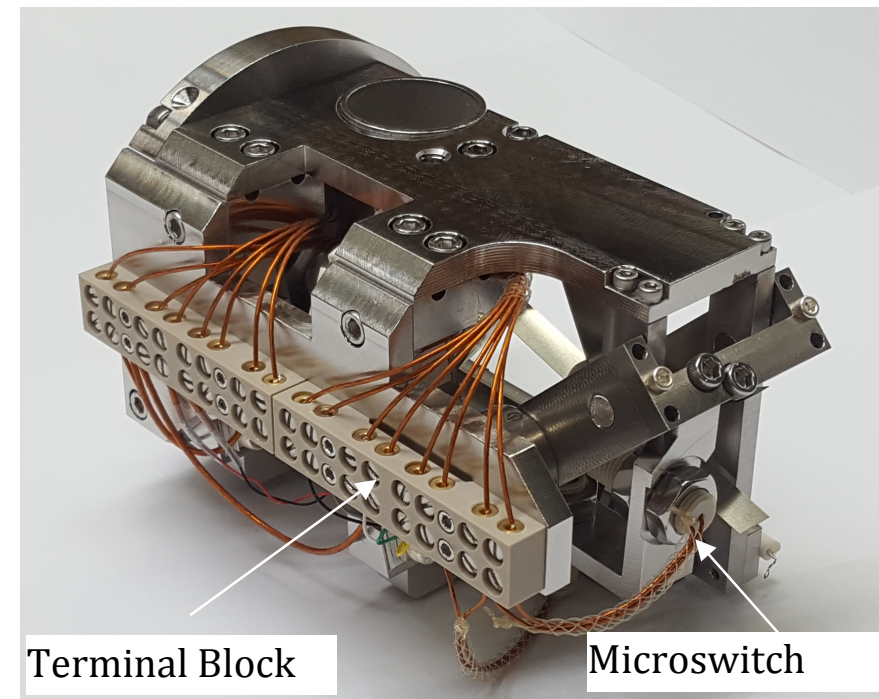
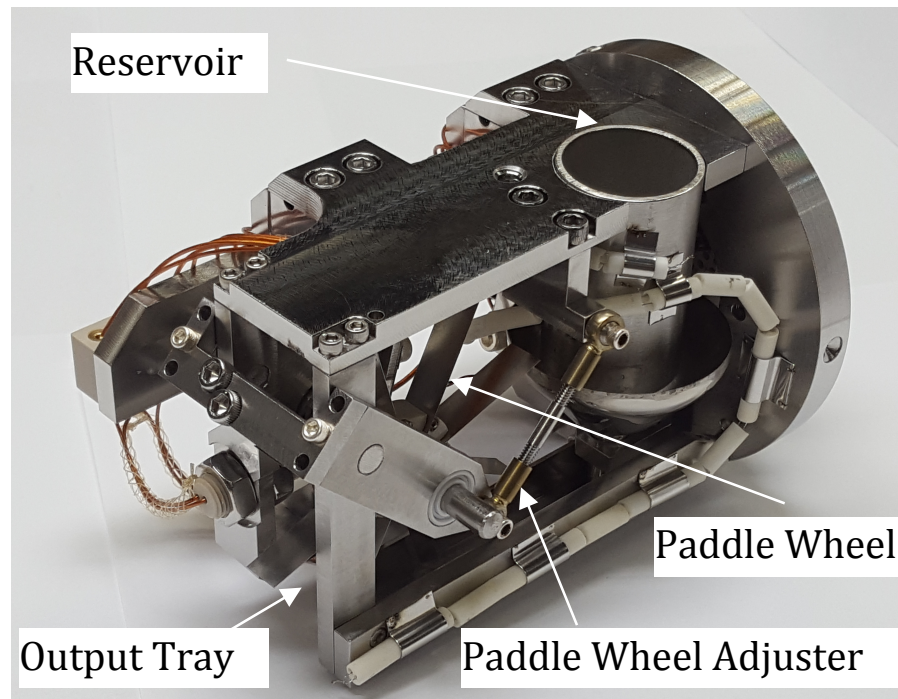
N. Pablant, EPS Conference Proceedings, (2018)

N. Pablant, IAEA 2018 *planned*

W7-X probe mounted powder injector (PMPI)

- PPPL has developed new powder delivery system capable of horizontal powder injection (now on site in Greifswald)
- Developed for use on W7-X for ease of installation on their Multi-Purpose Manipulator
- This proof-of-principle device will be used to test possibility of steady state boronization with multiple droppers for long-pulse operation

Experiments
planned for
Sept. 2018!




OP1.2: Physics Test of Divertor Scraper Elements

Two instrumented scrapers were installed in early 2018.

- Physics design: ORNL and IPP
- First half of experiment (no scraper) run in OP1.2a

Experimental program (ORNL-led) in OP1.2 will test physics and inform steady-state requirements:

- How will divertor pumping be affected?
- Will the scraper protect the divertor target edges as predicted?
- Can we validate the design basis?

-  Experiments scheduled for September 27

