EUROfusion

Topic 21: Filamentary transport in high-power H-mode conditions and in no/small-ELM regimes to predict heat and particle loads on PFCs for future devices

N. Vianello for the Topic 21 Scientific Team

29 May 2017

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 under grant agreement No 633053. The views and opinions expressed herein do not necessarily reflect those of the European Commission.

Scientific team

N. Vianello, D. Carralero, V. Naulin, W. Zhang, J. Madsen, K. McClements, M. Agostini, M.Spolaore, D. Aguiam, E. Wolfrum, J. Vicente, L. Florian, E. Seliunin, J. Galdon-Quiroga, C. Ionita, S. Costea ...

Objective of Week 21 campaign

✓ Compare divertor/midplane fueling effect on filamentary transport and profiles without cryo-pumps

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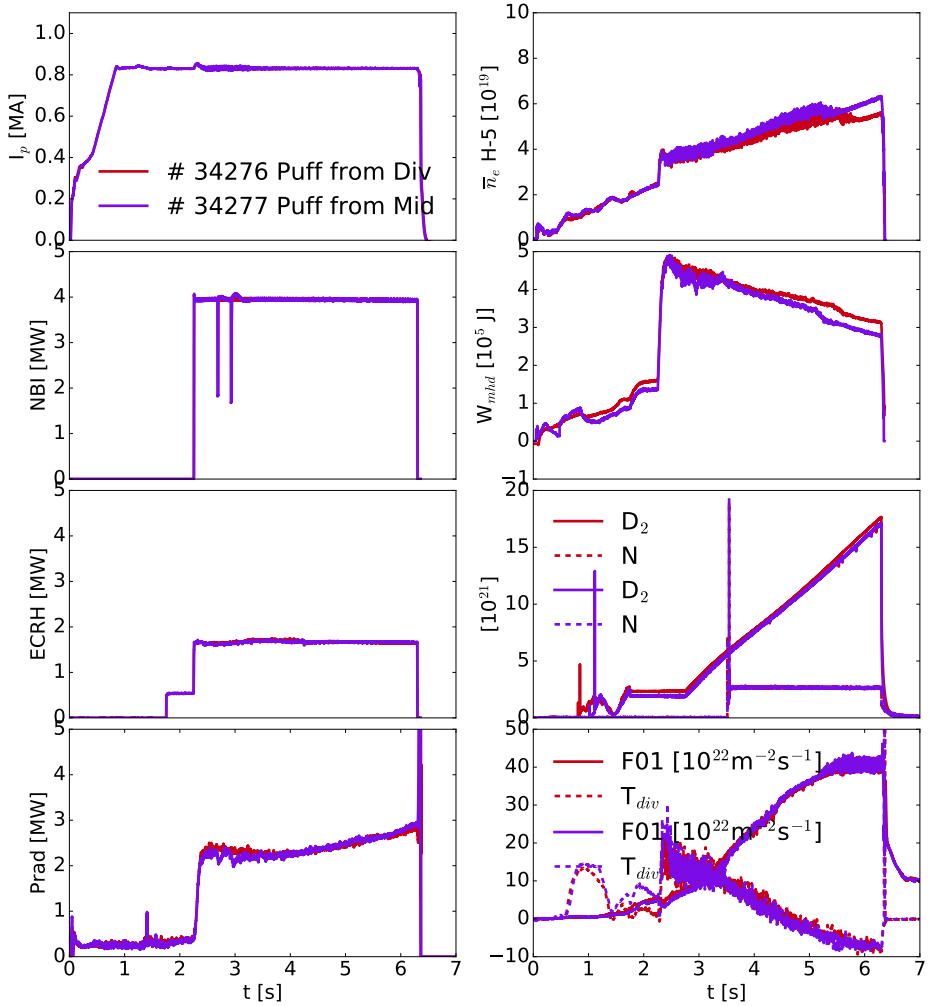
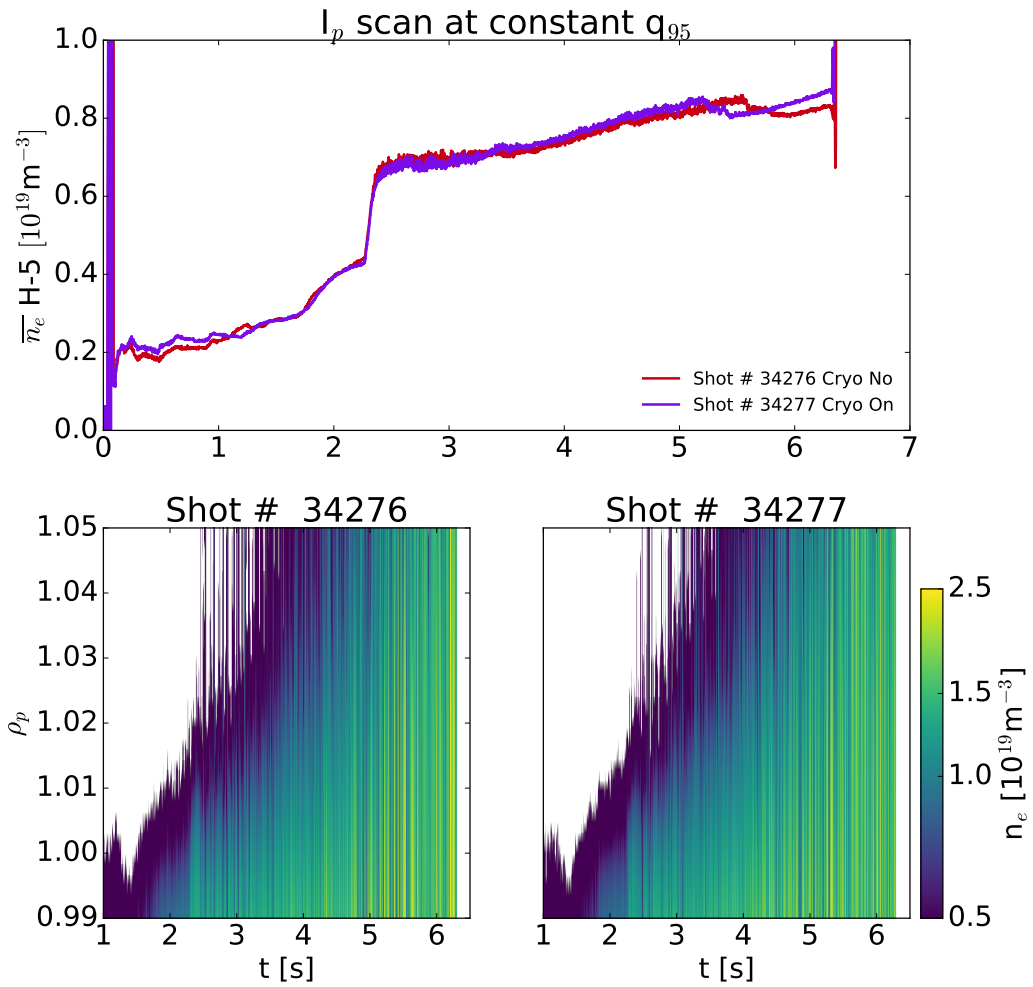
- ✓ Compare divertor/midplane fueling effect on filamentary transport and profiles without cryo-pumps
- ✓ Compare profiles with the same fueling with/without cryopums
- ✓ Determine an H-Mode with the cryopumps matching similar divertor pressure and SOL profiles

Compare divertor/midplane fueling



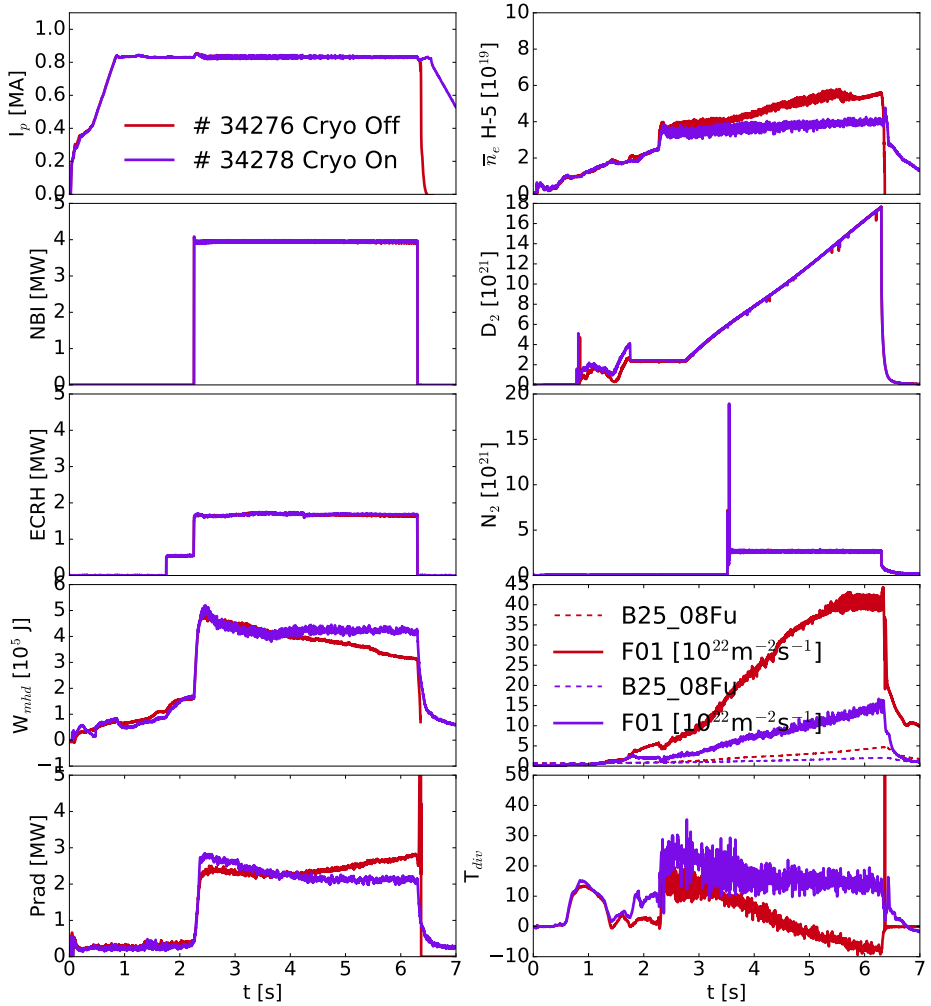
✓ Similar puff from the divertor or from the midplane without Cryopumps. The shots are pretty similar also in terms of Divertor pressure

Compare divertor/midplane fueling



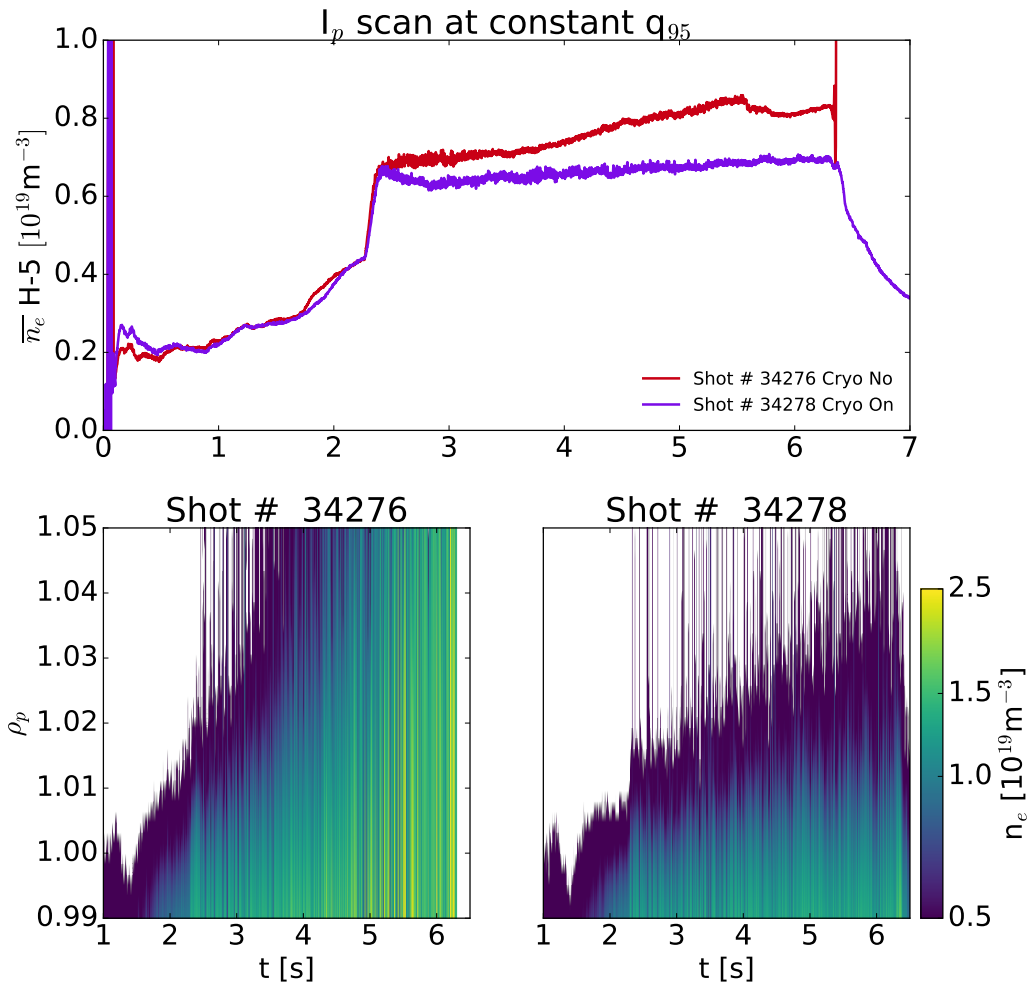
- ✓ Similar puff from the divertor or from the midplane without Cryopumps. The shots are pretty similar also in terms of Divertor pressure
- ✓ Edge density profiles from Li-Beam evolution are pretty similar

Compare Similar fueling with/without cryopumps



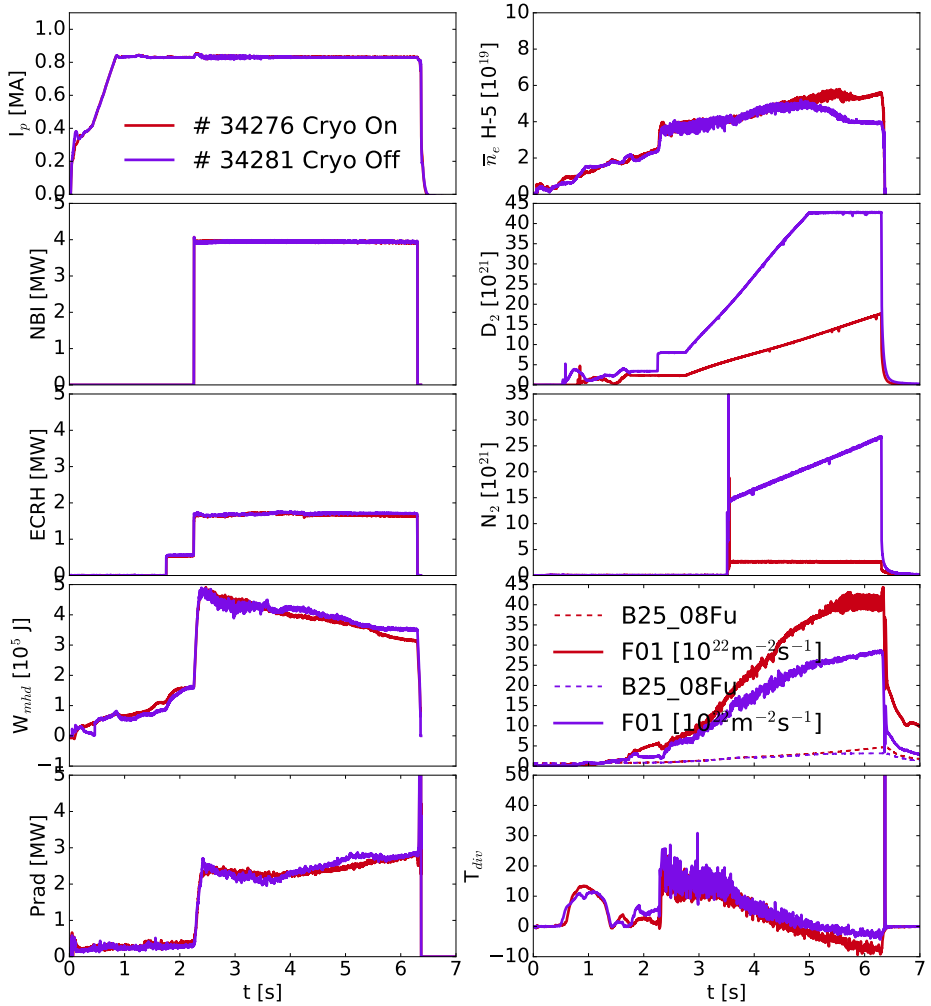
✓ Same fueling but with cryo-pumps. Clearly different in terms of Edge density and Divertor pressure

Compare Similar fueling with/without cryopumps



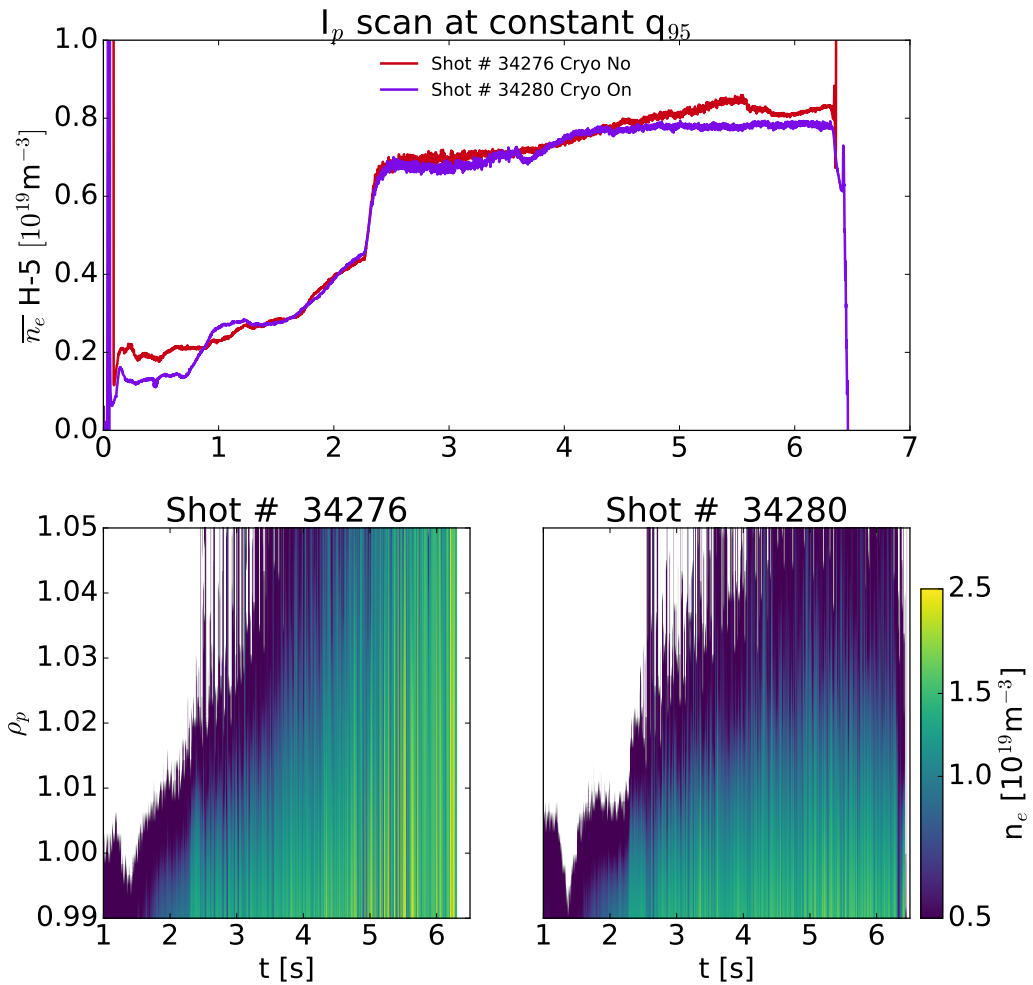
- ✓ Same fueling but with cryo-pumps. Clearly different in terms of Edge density and Divertor pressure
- ✓ Also with this amount of fueling any instance of SOL saturation observed

Matching scenarios with cryo-pumps



- ✓ To match similar edge density and divertor pressure and to reach the same level of detachment we increase the fueling by almost a factor of 3, increasing also the rate. In addition to that we also increase substantially the N puffing

Matching scenarios with cryo-pumps



- ✓ To match similar edge density and divertor pressure and to reach the same level of detachment we increase the fueling by almost a factor of 3, increasing also the rate. In addition to that we also increase substantially the N puffing
- ✓ Li-beam profile not yet produced for the same shots. With a lower level of N (no detachment observed) the SOL profiles does not flatten as in the case with the cryo-pumps

Work in progress

- ✓ Confirmed SXR spikes correlated with the start of ELMs, strongly suggesting electron accelleration during ELM filament eruption
- ✓ Evaluation progressing in terms of fluctuation analysis from MEM, Reflectometry, Li-Beam
- ✓ GPI data available in different density scenarios and also during L-H transition