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

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Scientific team

N. Vianello, D. Carralero, Z. Wei, 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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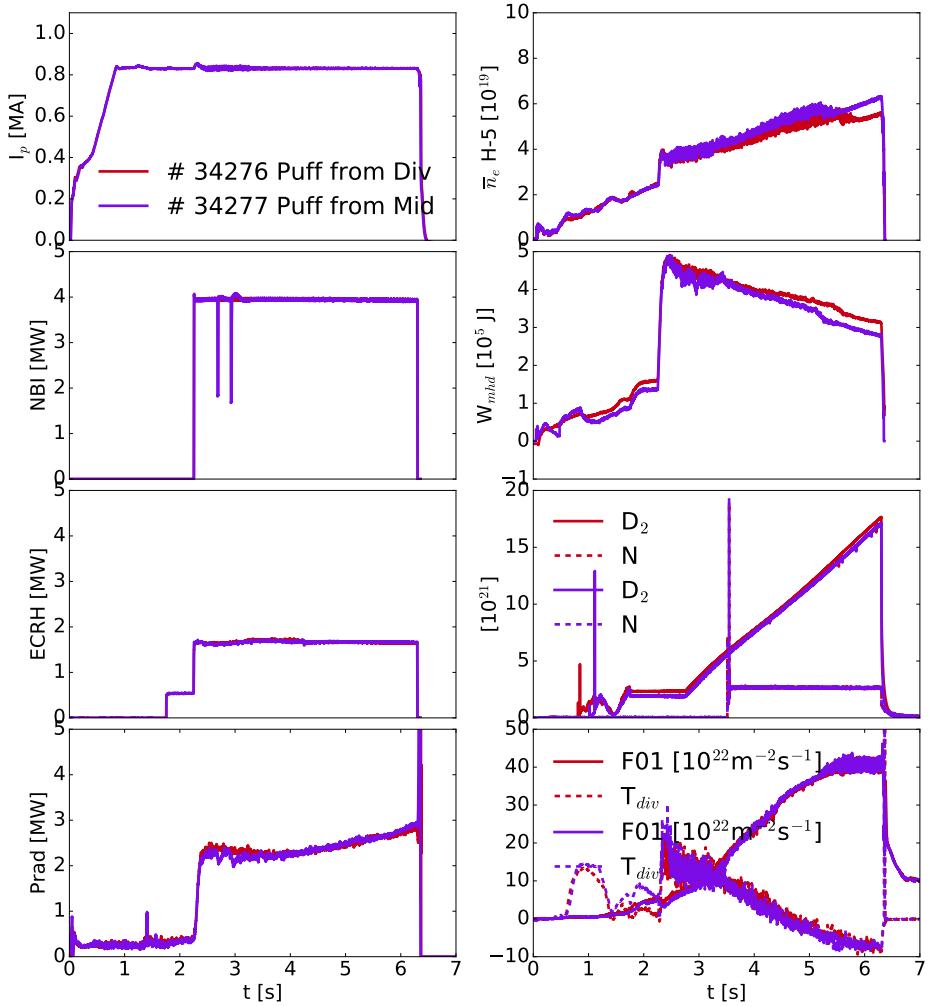
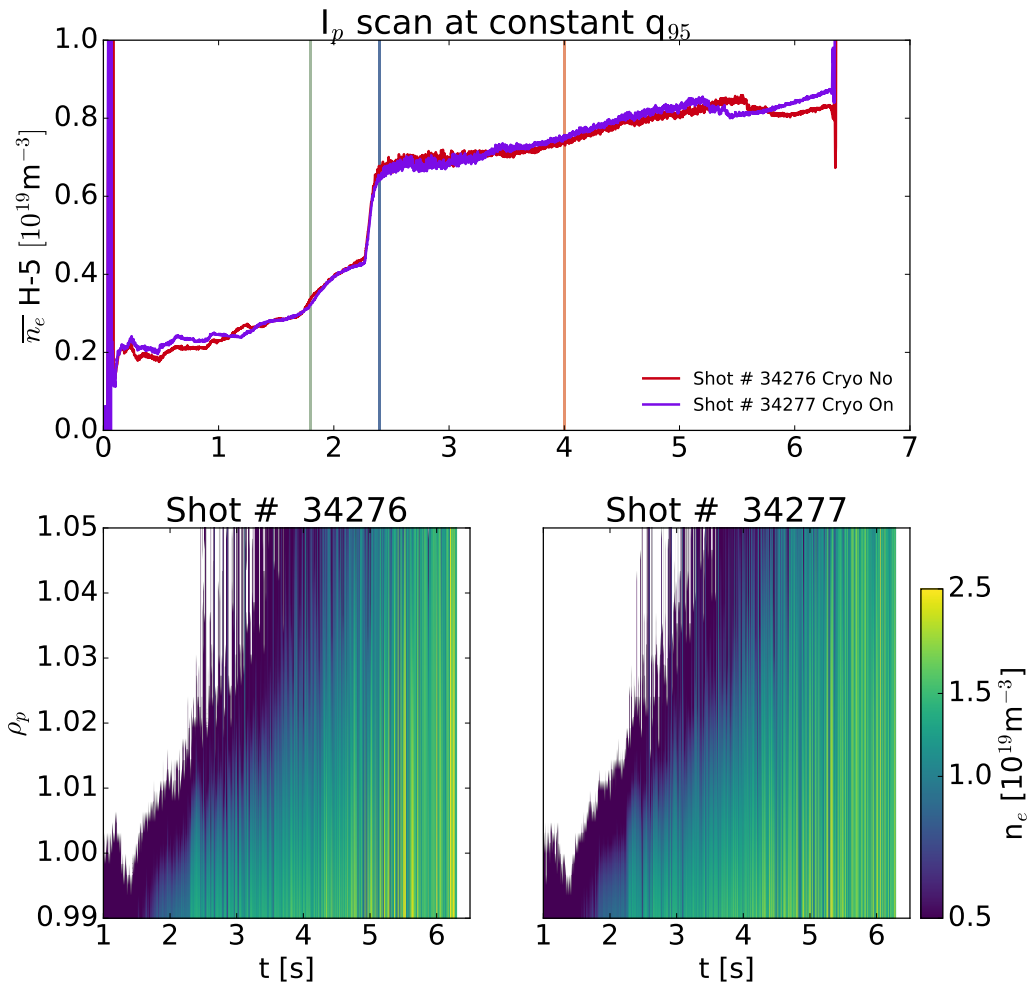
- ✓ Compare divertor/midplane fueling effect on filamentary transport and profiles without cryo-pumps
- ✓ Compare profiles with the same fueling with/without cryopums
- ✓ Determine an H-Mode with the cryopumps matching similar divertor pressure and SOL profiles

Compare divertor/midplane fueling



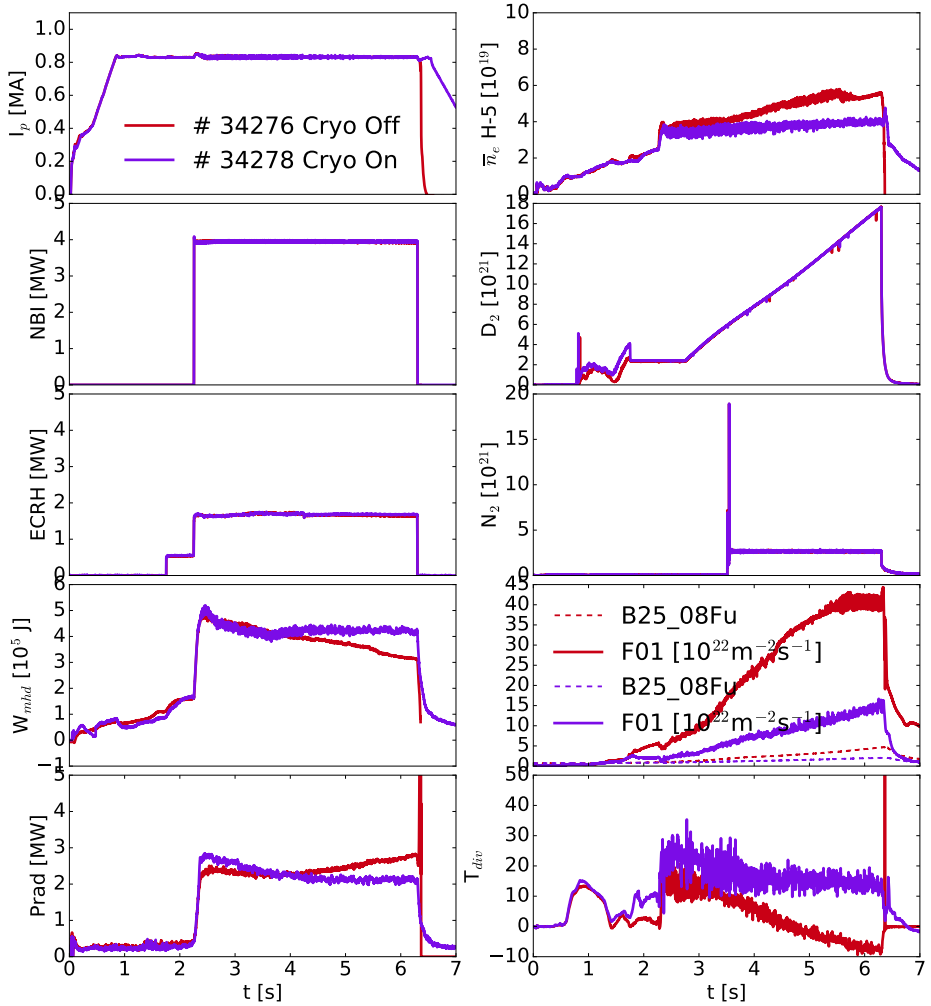
✓ Similar puff from the divertor or from the midplane without Cryopumps. The shots are pretty similar also in terms of Divertor pressure

Compare divertor/midplane fueling



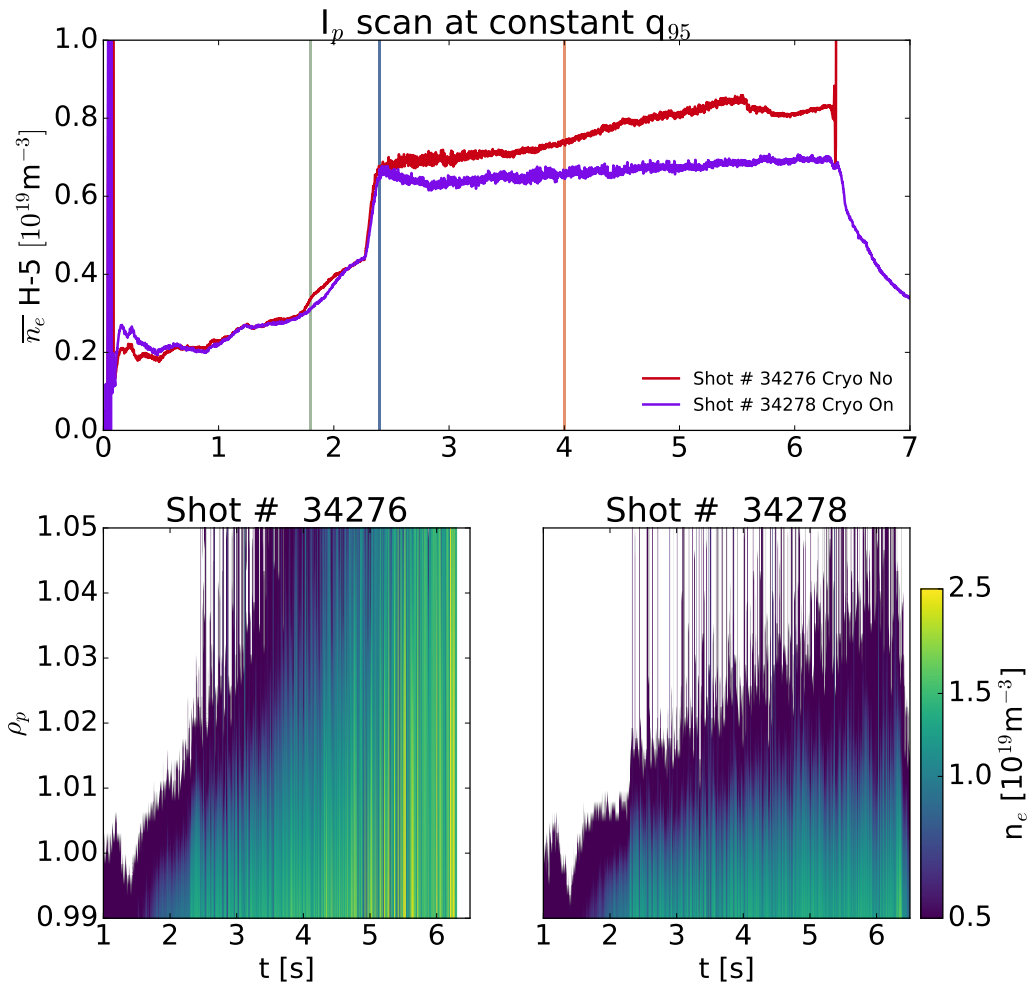
- ✓ Similar puff from the divertor or from the midplane without Cryopumps. The shots are pretty similar also in terms of Divertor pressure
- ✓ Edge density profiles from Li-Beam evolution are pretty similar

Compare Similar fueling with/without cryopumps



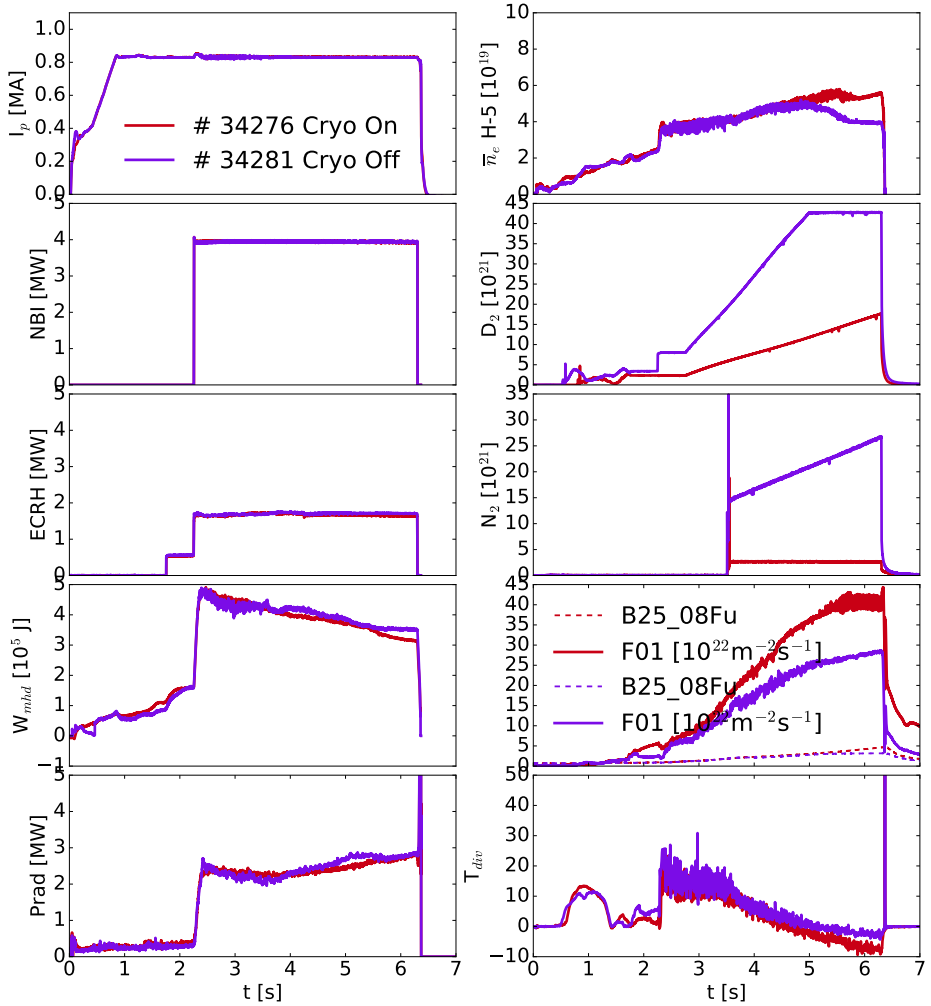
✓ Same fueling but with cryo-pumps. Clearly different in terms of Edge density and Divertor pressure

Compare Similar fueling with/without cryopumps



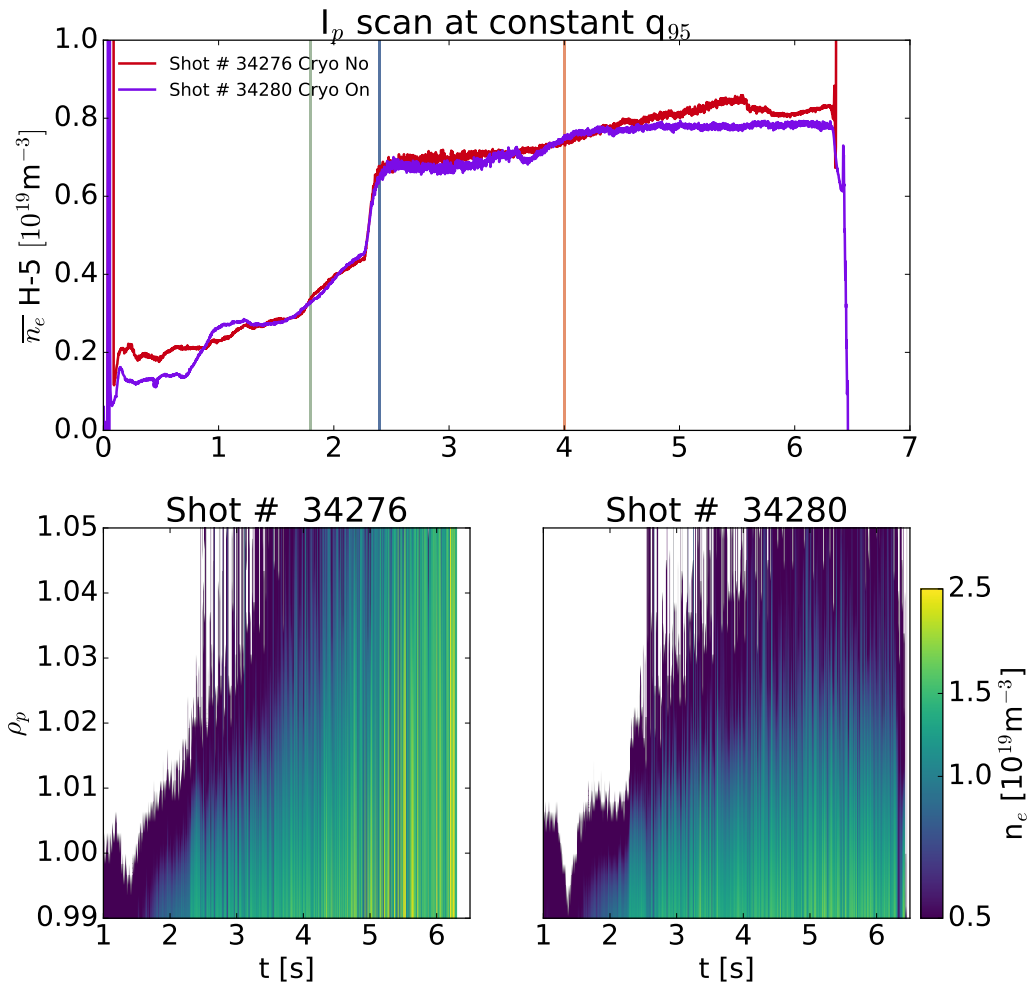
- ✓ Same fueling but with cryo-pumps. Clearly different in terms of Edge density and Divertor pressure
- ✓ Also with this amount of fueling any instance of SOL saturation observed

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