



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

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14 November 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.

**Include scientific team and logos**



Deliverables listed during the call for manning of last December

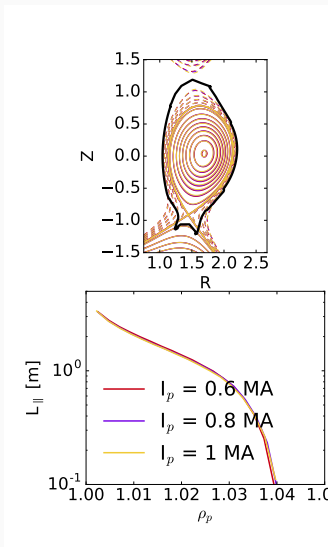
1. Provide cross-machine L-Mode shoulder dependence on current both at constant  $B_t$  and at constant  $q_{95}$
2. Establish robust scenario for density shoulder profile in H-Mode and establish dependence on fuelling/neutral profiles/divertor condition
3. Use the new HHF probe on AUG to study filamentary transport under high-power H-Mode conditions and under different plasma configurations (SN, DN)
4. Study the role of ELM regimes, neutral compression and particle density in filamentary transport and related shoulder formation
5. Identify the contribution of collisionality and seeding on filamentary transport and related shoulder formation
6. Determine the effect of filaments and shoulder formation on target heat loads in different H-mode plasmas



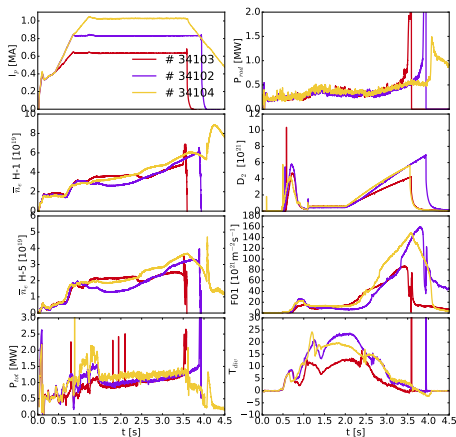
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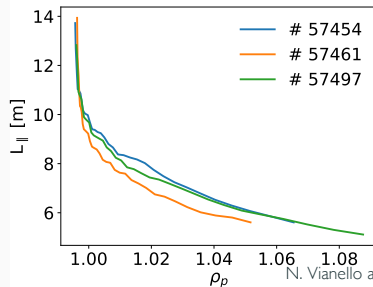
So far H-Mode operation has been limited to AUG since no operational scenario in high-density NBH heated plasma on TCV has been established



- ✓ AUG: All the shots were performed in the so-called Edge Optimized Configuration (EOC) shape
- ✓ AUG: We matched correctly the shape and the  $L_{\parallel}$  here shown from outer divertor plate up to X-point

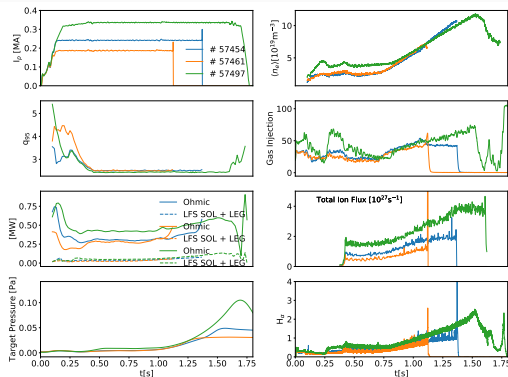


- ✓ AUG: The scan was performed with similar puffing rate (0.8-l MA) whereas we reduced it at lower current to avoid early disruption
- ✓ AUG: The total power (Ohmic plus NBI) was kept constant throughout the scan
- ✓ AUG: We have comparable edge density, divertor neutral pressure and divertor temperature



- ✓ TCV: We repeat the same exercise at TCV with a slight difference in the profile of parallel connection length. This required operation at unusual low toroidal field (up to 0.8T)

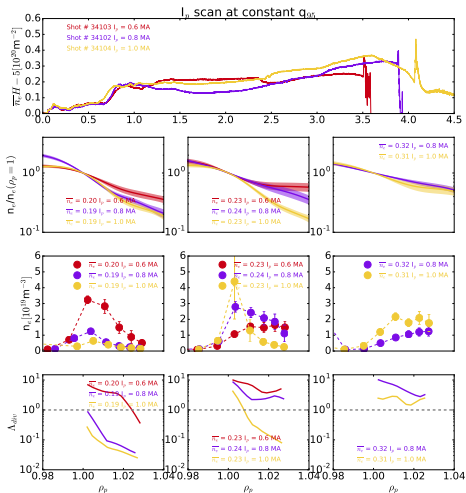
# L-Mode analysis: $I_p$ scan at constant $q_{95}$



- ✓ TCV: no additional heating used. Nevertheless the difference in power crossing the separatrix is small
- ✓ TCV: The difference in target pressure similar to AUG behavior



# L-Mode analysis: $I_p$ scan at constant $q_{95}$



- ✓ AUG: At comparable edge density Upstream profiles are different with the tendency to develop shoulder easier at lower current

# L-Mode analysis: $I_p$ scan at constant $q_{95}$

