# Gas scan to probe fuelling through the H-mode pedestal in JET

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Three point gas scan experiment in JET H-mode plasmas (Bt=2.7 T, I=2.15 MA, $P_{NBI}$=12 MW, low triangularity, strike points in the divertor corners) has been performed to study plasma fuelling while applying 3 Hz gas puff modulations. In this regime ELMs are of mixed type with large variations in their size and frequency. The average ELM frequency is around 100 Hz and the plasma responds well in the gas fuelling with pedestal density going up from 3.6e19/m3 to 4.8e19/m3 when the average fuelling is doubled from 2e22 to 4e22 electrons/s. The modulated gas fuelling is injected from the main chamber at top of the plasma (GIM8) while the steady state fuelling is in the divertor region and is varied to alter the pedestal and SOL densities. We investigate the response of the density to the modulated gas mainly around the pedestal and scrape-off-layer regimes to gain understanding of the plasma fuelling and transport at the plasma edge. The electron density modulation amplitude at the pedestal top is around 10% throughout the scan as seen in the Figure 1. The discharges within this scan are qualitatively similar with both strike points being attached.

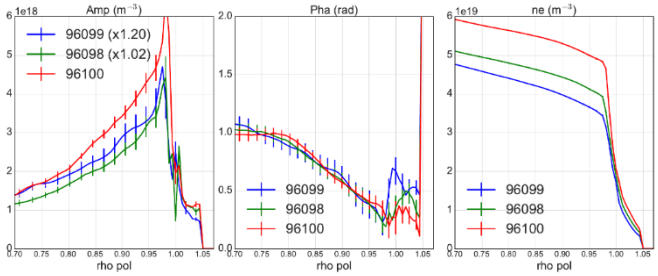


**Figure 1 Electron density modulation (a) amplitude, (b) phase and (c) profile for the three shots in the scan. Amplitudes are normalised to account the difference in the gas injection waveforms.**

In addition, we study some puzzling cases where electron density modulations are negligible although similar modulated gas puff injections are used and density pedestals are similar. Potential explanations such as ELMs and sawteeth synchronisation to the gas puff modulation frequency (3Hz) are explored. We also compare differences in pedestal density and temperature responses between these cases to conclude whether differences in the relative temperature and density responses can be linked to explain the fuelled and the non-fuelled cases.

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