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First results from recent JET experiments in Hydrogen and Hydrogen- Deuterium plasmas

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The hydrogen campaign completed at JET in 2016 has demonstrated isotope ratio control in JET-ILW using gas puffing and pellets for fuelling, Neutral Beam Injection alone or in combination, with D α /H α spectroscopy as a diagnostic. The plasma properties such as confinement, L-H threshold, density limit depend on the isotope composition. The L-H transition power increases with the hydrogen concentration with a wide plateau in the range $0.2 < n_D/(n_D+n_H) < 0.8$. Energy confinement is significantly lower in hydrogen than in comparable deuterium ELMy H-mode plasmas, suggesting an isotope mass scaling that is stronger than in IPB98(y,2). In L-mode, the isotope dependence of confinement is weaker. The H-mode density limit in hydrogen is up to 35% lower than in deuterium, whilst it is found to be higher in L-mode. The lower ion mass leads to reduced tungsten sputtering in hydrogen plasmas. During the campaign, the $n_D/(n_D+n_H)$ ratio dropped to ~1% in only a few discharges after the last deliberate introduction of deuterium, although it was seen to rise again to ~2% with several seconds of exposure of the divertor tiles to ~10MW of auxiliary heating. Several ICRH scenarios were also tested in hydrogen plasmas.

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Portugal

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