Recent experimental results and modeling of RF heating of (^{3}He)-D JET plasmas: RF as a tool to study transport

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^{3}He will be one of the species exploited intensively in the non-activated phase of ITER. Hence the need to devote JET experiments to the understanding of the behavior of plasmas containing ^{3}He fractions. D plasmas with ^{3}He minorities have sharp, thin ion-ion hybrid layers that enable to efficiently excite short wavelength branches that are subsequently damped by fairly well localized electron Landau and TTMP absorption. Depending on the minority concentration chosen, ion minority heating or electron mode conversion damping is dominant. But because of the limited distance between the mode conversion and the minority ion cyclotron layer, it is impossible to prevent that some of the power is lost to the ^{3}He when aiming at mode conversion heating and, likewise, minority heating is unavoidably accompanied by some electron mode conversion heating. Recent experiments have been devoted to the study of (^{3}He)-D JET plasmas. One aspect of those experiments is the study of the response of the plasma to RF power modulation, allowing to examine the fate of the RF power and to diagnose particle and energy transport. The RF modulation frequency is chosen to favor ion or electron dynamics. The present paper mainly discusses the outcome of probing various types of plasmas but the accent is predominantly on understanding ITB physics.

*See the Appendix of M.L.Watkins et al., Fusion Energy 2006 (Proc. 21st Int. Conf. Chengdu, 2006) IAEA, (2006)