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ICRH Physics in the Ignitor Experiment[1] A. CARDINALI, ENEA-UTS Fusione, Frascati, Italy, G. CENACCHI, A. AIROLDI, CNR - I.F.P., Milan, Italy — The Ignitor ICRH sytem can operate in a broad frequency range (80-120 MHz) and with a sufficient level of delivered power (4 up to 12 MW). The frequency band is consistent with the use of magnetic fields in the range 9-13 T. In this work a review of the ICRH physics is presented for i) full performance scenarios, ii) reduced parameters scenarios, and iii) double X-point configurations at 13 T and 9 MA. In all cases the ICRH is used to control the plasma temperature, to accelerate the achievement of ignition in the extended first wall configuration ($I_p \cong 11$ MA), and to help the transition to the H-regime in the X-point configuration. The power deposition profiles on ions and electrons are obtained by using a full wave code in a toroidal geometry configuration and are used as input data for a transport analysis. In particular, calculations show that a small fraction of ^{3}He (1-2%) improves the wave absorption on ions near the center of the plasma column, while a substantial fraction of the coupled power, owing to the $n_{\|}$-spectrum radiated by the antenna, is damped on the electrons in a broad radial interval of the plasma column. The conclusion is that in Ignitor, given the flexibility of its ICRH system, it is possible to control the plasma temperature and the transition to the H-mode in the X-point scenarios with modest amounts of ICRH power (< 8 MW).

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Special instructions: Ignitor poster session

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