Abstract Submitted
for the DPP10 Meeting of
The American Physical Society

ICRH System, Physics and Burn Control for the Ignitor Experiment[1] A. CARDINALI, M. SASSI, ENEA, Italy, S. MANTOVANI, B. COPPI, MIT — The ICRH system for the Ignitor experiment is designed to operate over a broad frequency range (80-120 MHz), generating 16 down to 8 MW of power. The frequency band is consistent with the use of magnetic fields in the range 9-13 T. A study of the ICRH physics is presented for the reference maximum performance scenario, ($B_T = 13$ T, $I_p = 11$ MA) with particular emphasis on the control of the thermonuclear instability by means of ICRH. In the case where internal plasma modes may not be effective in saturating the thermonuclear instability at acceptable levels without external action, a scenario is considered where Ignitor is led to operate in a slightly sub-critical regime, by adding a small fraction of ^{3}He to the nominal 50-50 Deuterium-Tritium mixture. The difference between power lost and α-heating is compensated by additional ICRH heating, which should be able to energize the minority species (minority heating) directly, and then increase the global plasma temperature via collision. The power deposition profiles on ions and electrons are obtained by means of a full wave code in toroidal geometry configuration and they are used as input data to solve the temperature evolution equation.

[1]Sponsored in part by ENEA of Italy and by the U.S. D.O.E.

B. Coppi
MIT

Date submitted: 12 Jul 2010 Electronic form version 1.4