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**Importance of the Ideal Ignition Conditions and Intermediate Objectives of Ignitor**[1] G. CENACCHI, ENEA, Italy, A. AIROLDI, D. FARINA, B. COPPI, MIT — At the ideal ignition temperature, in D-T plasmas where the produced $\alpha$-particles can be confined by the necessary current, the energy loss by bremsstrahlung emission is compensated for by the $\alpha$-particles heating. Once this condition is reached, the plasma density can be raised during the plasma heating phase without encountering a radiation barrier. This is a meaningful intermediate objective for Ignitor operating with $B_T \simeq 9$ T, a double X-point (on the first wall) configuration, and $I_p \simeq 6$ MA, as well as in the 'extended limiter' configuration with $B_T \simeq 9$ T and $I_p \simeq 7$ MA. Numerical simulations have been performed considering volume average $n_e \simeq 2 \times 10^{20}$ m$^{-3}$, average $Z_{eff} \simeq 1.5$, and 5 MW of ICRH power absorbed by the plasma. Even without accessing the H- regime and with pessimistic assumptions about the energy confinement time (such as that corresponding to the ITER97L scaling) the peak temperatures are 5.5 to 6.5 keV and the $\alpha$ heating power can be as high as 2 MW. The available ICRH power, combined with the Ohmic and $\alpha$-particle heating, makes the access to the H-regime possible in this case as well as in that for which full ignition can be approached ($B_T \simeq 13$ T, $I_p \simeq 9$ MA).

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B. Coppi
MIT

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