

Abstract Submitted
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Effects of Radial Profiles in the H-Regime for Ignitor¹ G. CENACCHI, A. AIROLDI, Italy, P. DETRAGIACHE, ENEA, Italy, B. COPPI, MIT — The radial profiles of the main plasma parameters in the central region of the plasma column and their connection to those at the edge have an important influence on the levels of fusion power that Ignitor can achieve by accessing the H- regime. It is well established by now that the fusion power can be strongly degraded ($\propto B_T^{3.5}$) by decreasing the magnetic field² and consequently the plasma current and the density limit. Ignitor does not have the last constraint but maintaining a reasonable magnetic safety factor is important. Therefore the maximum design field (13 T on axis) is considered. Then an analysis of the operating parameter space (in the H-regime) using a zero-dimensional model shows that a considerable ample space exists when $Q = 10$ is attained for a plasma pressure profile moderately peaked ($p_0/\langle p \rangle = 2.9$) and various scaling expressions for τ_E and P_{thr} . A considerably improved performance (with Q up to 100) can be achieved by a modest increase in the assumed density profile peaking, leading to an attractive regime of operation with moderate power flux to the wall (below about 20 MW) when a newly-proposed scaling expression³ for P_{thr} is used.

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²R.V. Budny, et al., Report PPPL- 4300 (March 2008)

³D.C. McDonald, et al., *Plasma Phys. Control. Fusion* **48**, A349 (2006)

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