

Abstract Submitted
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Influence of Collisionality and Density Peaking on Thermal Transport¹ F. BOMBARDA, Associazione Euratom-ENEA sulla Fusione, Italy, B. COPPI, M.I.T. — A consensus has formed around the idea that electron collisionality plays a major role in determining the quality of thermal transport in toroidal plasmas. Future burning plasma experiments will operate at similar, relatively low values of the dimensionless collisionality parameter ν_* , but at densities that for ITER are close to the critical density and for Ignitor, thanks to its high current density, are about half that value. The trends of the energy confinement time with collisionality have been analyzed for early Ohmic plasmas in Alcator C-Mod and FTU. The former showed an almost linear correlation with $1/\nu_*$ followed by a saturated regime; the latter was characterized, at the time, by high impurity content and did not display any clear trend. For more recent, and cleaner, FTU data, the behaviour of τ_E as function of density and density profile peaking has been studied, for simple Ohmic and pellet injection discharges. The results have been compared with theory². In order to ensure fine profile density control in Ignitor, especially during the critical phase of the initial current rise, a fast pellet injector is being built in collaboration between ENEA and ORNL. Possible experiments to be carried out on existing machines are presented that could add further support to the proposed ignition scenarios for Ignitor.

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²B. Coppi, M.I.T.-RLE Report PTP 04/07, Cambridge 2004

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