Abstract Submitted
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Thermal Stability Studies of Ignitor Plasmas[1] JULIO MARTINELL, ICN-UNAM — Conditions for the operation of a tokamak fusion reactor are studied considering a fiducial operating state and analyze variations about this state. We use a volume averaged 0-D two-temperature model. The variation of parameters such as the fusion power, the energy gain and the auxiliary heating power are represented in POPCON plots of density versus electron temperature, in order to determine the optimal operation point. We study the case of an ignited plasma with the characteristics of the Ignitor experiment [1]. Then the behavior of the burning plasma under the thermonuclear instability is studied, which may arise in some temperature ranges. The stability is analyzed by finding the eigenvalues of the equations resulting from a variation of the electron and ion temperatures using a linear approximation. For negative eigenvalues the system is stable but if a single eigenvalue is negative then the stability appears. We find that the thermonuclear instability may appear and the unstable regions in temperature and density are determined. Results are given by showing contours of marginal stability in POPCON plots.

[1] B. Coppi, et. al., Nuclear Fusion 41, 1253 (2001).

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