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Analytical Model for the Thermonuclear Instability in IGNITOR* A. CARDINALI, ENEA, G. SONNINO, Universite Libre de Bruxelles, B. COPPI, MIT — The non-linear energy balance equation for thermal equilibrium and stability, is analytically and numerically investigated in order to study the thermonuclear instability in the IGNITOR experiment facility. The expressions for the ion and the electron thermal coefficients, introduced in the thermal energy balance equation, are obtained by solving the nonlinear transport equations relevant to several collisional transport regimes (in particular the banana regime). The differential equation for the temperature profile at equilibrium is solved and the resulting profile is compared with the results obtained by a full transport code. The growth of the perturbation in the temperature is analyzed by integrating the equation in time. 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 and heating the plasma by ICRH power. *Sponsored in part by the US DOE.

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