Abstract Submitted
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Experiment on D-^{3}He Burning Physics L. MERRIMAN, B. COPPI, MIT — The D-^{3}He reaction products are charged particles with $\langle\sigma_F \mathrm{v}\rangle$ about $3\alpha_F 10^{-17}$ cm^3/sec and $\alpha_F \sim 1$ for temperatures around 40keV. The relevant ideal ignition temperature, $T_I \simeq 27$keV for homogeneous plasmas, is a meaningful objective to achieve. For peak densities $n_D^0 + n_{^3He}^0 \simeq 10^{15}\mathrm{cm}^{-3}$, in the range of those obtained by the Alcator experiments, and the plasma pressure is compatible with the toroidal magnetic fields around 14T this condition could be reached. The machine (CANDOR II) that is envisioned [1] is based on recently proposed high field hybrid magnet technology employing moderate (i.e. MgB_2) and high temperature superconductors. The major radius is $R_0 \simeq 1.8$m and the minor radii $a \times b = 0.66 \times 1.15\mathrm{m}^2$ while the plasma current $I_p \simeq 15$ MA. Then $\bar{B}_p = (I_p/5) \,/\, (a \times b)^{1/2} \simeq 3.44$T. The main technological solutions developed for the Ignitor program are adapted to the design for the new machine.*Sponsored in part by the U.S. DOE.

[1] B. Coppi, Nucl. Instr. and Meth. in Physics Research A2712-3 Holland (1988).

Bruno Coppi
MIT

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