

Abstract Submitted  
for the DPP19 Meeting of  
The American Physical Society

**Parameter of Merit for Experiments Aiming at DT Ignition<sup>1</sup>** D.

BORGOGNO, ISC-CNR and Politecnico di Torino (Italy), B. COPPI, MIT — Given the importance of reaching ignition conditions in magnetically confined plasmas [1] it is appropriate to identify parameters of merits for the design of future machines. One considered for the Ignitor experiment is  $P_{mI} = B_p^2 I_T$ , where  $I_T$  is the toroidal plasma current and  $B_p$  is the average poloidal field, aiming for about 100 (T2 MA). The starting point for  $T_e \simeq T_i$ , is  $\Re \simeq \alpha_T n T D_{\perp}^{th} / a^2$  where  $\Re$  is the D-T reactivity,  $\Re \propto \alpha_F n^2 T^2$  and  $a$  is the mean plasma radius. Assuming  $D_{\perp}^{th} \propto \alpha_D / n$  and  $n \propto \alpha_L J$ , where  $J$  is the current density,  $\alpha_F n^2 T^2 \simeq \alpha_T n T \alpha_D / (J a^2 \alpha_L)$  and, for  $n T \propto \alpha_c B_p^2$  we obtain  $B_p^2 I_p \propto (\alpha_D \alpha_T) / (\alpha_F \alpha_c \alpha_L)$ . The introduced  $\alpha$ -parameters involve weaker dependences on plasma and machine characteristics than those given already.

[1] B. Coppi and the Ignitor Team, Nucl. Fus. 55, 053001 (2015).

<sup>1</sup>Sponsored in part by the U.S. Department of Energy and by C.N.R. of Italy.

Bruno Coppi  
Massachusetts Institute of Technology

Date submitted: 28 Jun 2019

Electronic form version 1.4