

Abstract Submitted  
for the DPP08 Meeting of  
The American Physical Society

**Global Machine Design and Double X-point Equilibrium Configurations for Ignitor\*** A. BIANCHI, B. PARODI, ANSALDO Ricerche, Italy, B. COPPI, M.I.T. — The detailed design of the Ignitor machine has been carried out by considering extended limiter plasma configurations that are up-down symmetric and whose outer magnetic surfaces follow closely the cavity of the toroidal magnet over most of the vertical cross section. This provision minimizes the out-of-plane forces produced by the plasma current and acting on the toroidal magnet. When, instead, the adopted plasma equilibrium configuration is of the double X-point type the out-of-plane forces increase, and a complete structural analysis to take this increase into account becomes appropriate. The reference maximum plasma current  $I_p$ , in order to maintain an acceptable magnetic safety factor, is reduced from 11 MA in the extended limiter to 9 MA in the double X-point configuration while the magnetic field on axis ( $R_0 \cong 1.32$  m) is maintained at  $B_T \cong 13$  T. The reduced scenario involving  $I_p \cong 6$  MA and  $B_T \cong 9$  T does not present a problem. Both 3D and 2D drawings of each individual machine component are produced using the Dassault Systems CATIA-V software. After their integration into a single 3D CATIA model of the Core (Load Assembly), the electro-fluidic and fluidic lines which supply electrical currents and helium cooling gas to the coils are included and mechanically connected to the main machine components.

\*Sponsored in part by ENEA of Italy and by the U.S. D.O.E.

Bruno Coppi  
M.I.T.

Date submitted: 17 Jul 2008

Electronic form version 1.4