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Design of the IGNITOR Plasma Start-up and Scenarios* G. RAMOGIDA, G. CENACCHI, A. COLETTI, A. CUCCHIARO, ENEA, Italy, F. VILLONE, F. RUBINACCI, CREATE, Italy, B. COPPI, MIT — IGNITOR is a high field, high plasma current compact experiment designed to be first to reach and study ignited plasma conditions. The design is characterized by a high degree of flexibility obtained by mean of a higher number of poloidal coils and a "large" volume available to the plasma relative to the machine overall dimensions. The most advanced operation scenario (11 MA, 13 T) is based on one that involves the optimal filling of the plasma chamber ("extended First Wall configuration"). The double X-point plasma configuration (X- points on the plasma chamber) enables it to reach ignition with a relatively modest amount auxiliary heating and a sufficient magnetic safety factor in the H-regime. This scenario involves a plasma current of 9 MA with the 13 T maximum toroidal field. Other plasma scenarios with reduced performances are based on a 9 T toroidal field and involve plasma currents of 7 or 6 MA, in the extended First Wall or the double X-point configuration, respectively. The plasma start-up phase has been carefully studied and an optimal choice of the poloidal field coils currents has led to obtaining a relatively large area with a nearly null and flat magnetic field, without reducing the available maximum flux swing (up to 36 Wb) from the Poloidal Field coils system. *Sponsored in part by ENEA and the US D.O.E.

B. Coppi
MIT

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