Abstract Submitted
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The Columbus Concept[1] M. SALVETTI, B. COPPI, M.I.T. — A spectrum of experiments is required for a "Science First" approach to fusion research[2]. The possible discovery of new phenomena and the understanding of known ones, i.e. sawtooth oscillations, under fusion burning conditions will cetainly influence the design of future fusion reactors. The Columbus concept[3] takes advantage of the Ignitor R&D effort,including the construction of full size component prototypes. Relative to Ignitor, Columbus is characterized by increased linear dimensions ($R_0 \cong 1.5$ m is the plasma torus major radius) and by lower current densities in the magnets and within the plasma column. The toroidal magnetic field is decreased by the factor 12.6/13 and the average poloidal field produced by the plasma current is about equal to that of Ignitor for comparable values of the magnetic safety factor (q_0). The reference plasma current is $I_p \cong 12.2$ MA, the value that ITER would produce for the same q_0 but without reaching ignition. The machine is based on cryogenic resistive magnet technologies and an optimized plasma confinement configuration which allow it to reach (real) ignition conditions by fusion reactions. Columbus is proposed for construction in the U.S.

[1]Sponsored in part by the U.S. D.O.E.
[2]B. Coppi, MIT-RLE Report PTP02/04 (2002), Presentation to the NRC
[3]B. Coppi and M. Salvetti, MIT-RLE Report PTP02/06

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