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Design Criteria and Machine Integration of the Ignitor Experiment[1] A. BIANCHI, ANSALDO, B. COPPI, MIT, Ignitor Project — High field, high density compact experiments are the only ones capable of producing, on the basis of available technology and knowledge of plasma physics, plasmas that can reach ignition conditions. The Ignitor machine ($R_0 \cong 1.32$ m, $a \times b \cong 0.47 \times 0.83$ m^2, $B_T \leq 13$ T, $I_p \leq 11$ MA) is characterized by a complete structural integration of its major components. A sophisticated Poloidal Field system provides the flexibility to produce the expected sequence of plasma equilibrium configurations during the plasma current and pressure rise. The structural concept of the machine is based on an optimized combination of "bucking" and "wedging". All components, with the exception of the vacuum vessel, are cooled before each plasma pulse by means of He gas, to an optimal temperature of 30 K, at which the ratio of the electrical resistivity to the specific heat of copper is minimum. The 3D and 2D design and integration of all the core machine components, including electrofluidic and fluidic lines, has been produced using the Dassault CATIA-V software. A complete structural analysis has verified that the machine can withstand the forces produced for all the main operational scenarios.

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