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Solutions and Objectives of the Ignitor Program* F. BOMBARDA, ENEA, Italy, B. COPPI, MIT, THE IGNITOR PROJECT TEAM — The main purpose of the Ignitor experiment[1] is to establish the "plasma reactor physics" in regimes close to ignition, as required for realistic and economical reactors, where the "thermonuclear instability" can set in with all its associated non-linear effects. Reactor relevant plasma regimes require[2] $Q > 50$. The only appropriate technological solution at this time to reach this objective is the adoption of normal-conducting magnets. Furthermore, experiments without a divertor chamber can sustain, for equal overall sizes and magnetic field values, higher currents and therefore achieve better confinement parameters[2]. In fact, Ignitor can operate with both an "extended first wall" configuration and double X-points on the first wall and lower currents to access H-mode regimes. Since the process of attaining ignition has been investigated extensively[1], a special effort has been devoted to identify the conditions where the thermonuclear instability is barely prevented over the entire length of the current pulse. While tritium is the necessary step forward of any advanced fusion facility, Ignitor can provide novel and important results even when limited to operate with H, D, and He plasmas in the early phase of its experimental life. *Sponsored in part by ENEA of Italy and by the U.S. D.O.E.

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