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Popularity of the Compact Machine Approach in Fusion Research and Pioneering Role of the Ignitor Program[1] A. AIROLDI, MIUR, B. COPPI, MIT, THE IGNIR COLLABORATION — Several factors have led to an increase in popularity for the pursuit of advanced fusion research by compact machines. The Ignitor program has started this line of research on fusion burning plasmas as a development of the Alcator and Frascati Torus projects motivated more by basic physics considerations than speed and cost. Advances in high field superconducting magnets followed within the Ignitor program [1,2] have broadened the perspectives for its development. High values of $n\tau$ are expected considering n related to $\bar{J}_{\|} \sim \bar{B}_p/\bar{a}$ ($\bar{a}$ =mean plasma radius and $\bar{B}_p$ = mean poloidal field) and that τ has a favorable dependence on I_p, the total plasma current. If $nT \propto \bar{B}_p^2/(2\mu_0)$, the reactivity $n^2 \langle \sigma_F v \rangle \propto n^2 T^2 \propto \bar{B}_p^4$. Thus a main guiding feature for advanced fusion burning experiments is that of appropriate and combined high values of the $\bar{B}_p$ and I_p parameters, minimizing the input power of auxiliary heating systems.

[1] B. Coppi, *et al., Nucl. Fus.* 53, (2013) 104013.
[2] B. Coppi, *et al., Nucl. Fus.* 55 (2015) 053011.

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