Novel Hybrid Reactor Concepts Based on Ignitor Technology and Physics

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A development of the Ignitor program, aimed at making fusion energy of near term relevance, is that of starting from technology and physics advances on which the Ignitor effort is based to conceive novel hybrid reactors. High field compact machines have produced record high density plasmas with excellent confinement properties that can be utilized as neutron sources for power producing reactors with Thorium as its fissile component (E. P. Velikhov 2019). The Columbus concept [1], that had been studied as a follow-up to Ignitor in order to investigate the burn conditions of Tritium deprived plasmas, has been reconsidered as a neutron source to start by taking into account that approaching ignition is not the objective of it but other requirements have to be complied with. In this context, C. Bolton (2020) has suggested adopting pure-D plasmas for which the high field approach is appropriate and this attractive option is being analyzed including relevant advances in material science and fission reactor engineering.

*Sponsored in part by CNR-ISC of Italy.

[1] 1. B. Coppi and M. Salvetti, MIT (RLE) Report PTP 02/06, December 2006.