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**Well Confined High Density Plasmas as Neutron Sources**[1] A. BIANCHI, ANSALDO, B. COPPI, MIT — The physics of high density plasmas ($n_0 \simeq 5 \times 10^{14} - 10^{15}$ cm$^{-3}$) that can be well confined in high magnetic field, compact machines, and that can be developed into interesting neutron sources is discussed. Ignitor[1], a machine following a line of which Alcator was the prototype, that has been conceived and designed in order to demonstrate ignition of a D-T burning plasma, can produce up to $3 \times 10^{19}$ n/sec although with too low a duty cycle. Therefore, a non-igniting, differently conceived device with an adequate duty cycle is being analyzed. An important element for this is the development of cables involving the recently discovered $MgB_2$ superconducting material for which the He-gas cryogenic system designed for Ignitor can be adopted. The two largest poloidal (vertical) field coils for Ignitor are in fact designed with these kind of cables. We propose extending the adoption of this material for other magnet systems through a hybrid solution, in contrast to the pure copper solution adopted for Ignitor, taking advantage of the higher current densities that $MgB_2$ can sustain, and of the structural characteristics of the relevant cables.

[1] B.Coppi, *et al.* Paper FT/P3-23 (Publ. I.A.E.A., Vienna 2008)

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