

Abstract Submitted
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**Ignitor-
like Toroidal Devices for Neutron Production**¹ FRANCESCA BOMBARDA,
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COPPI, M.I.T. — Compact fusion toroidal machines operating in DT have the po-
tential to become efficient sources of neutrons for material testing. An Ignitor-like
device could be envisaged for this purpose, making full use of the intense neutron
flux that it can generate without reaching ignition. Preliminary radiation damage
estimates for some fusion-relevant materials² have shown that few full-power months
of operation would provide adequate dpa levels. The main features and technological
issues of a High Field Neutron Source Facility based on the Columbus concept,³ with
about 50% more volume than Ignitor, are illustrated and discussed. Optimization
of the plasma temperature and density relative to the reference ignition scenario
(with the assistance of auxiliary heating power) can achieve considerable reductions
of duty cycle requirements. The constraints imposed by flux availability, magnet
heating and wall loading will inevitably impose a complete redesign of the machine,
with the adoption of novel materials (such as MgB₂ superconductor already adopted
for Ignitor), and new modes of operation will need be investigated.

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²F. Bombarda, B. Coppi, et al., *Fus. Eng. Des.* **86**,2632 (2011)

³B. Coppi and M.F. Salvetti, *MIT Report PTP02/06*, (2002)

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