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Innovation in fusion energy sciences: looking towards the future

SIMON WOODRUFF, University of Washington, Y.C. FRANCIS THIO, Office of Fusion Energy Sciences, THOMAS R. JARBOE, University of Washington — During the last 50 years, about 10% of the fusion budget in the United States has been spent on experiments that investigated alternates to the tokamak and stellarator. The alternates comprise not only open and closed magnetic configurations but also inertial concepts, and more recently hybrids of both magnetic and inertial (e.g. MIF). This concept innovation remains a necessary component of a healthy fusion program: even as ITER goes ahead, the mission of the world fusion program remains to produce an economic fusion reactor, the path to which still remains unclear. For the present-day vision of the tokamak reactor, an order of magnitude increase in performance is still required in order to make it attractive in the near-term. This paper summarizes recent advances in alternates and presents the arguments supporting concept innovation (or configuration optimization) as necessary to make headway towards the goal of economic fusion energy.

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