

Abstract Submitted
for the DPP09 Meeting of
The American Physical Society

Dynamical Safety Analysis of the SABR Fusion-Fission Hybrid Reactor TYLER SUMNER, WESTON STACEY, SEYED GHIAASSIAN, Georgia Tech — A hybrid fusion-fission reactor for the transmutation of spent nuclear fuel is being developed at Georgia Tech. The Subcritical Advanced Burner Reactor (SABR) is a 3000 MWth sodium-cooled, metal TRU-Zr fueled fast reactor driven by a tokamak fusion neutron source based on ITER physics and technology. We are investigating the accident dynamics of SABR's coupled fission, fusion and heat removal systems to explore the safety characteristics of a hybrid reactor. Possible accident scenarios such as loss of coolant mass flow (LOFA), of power (LOPA) and of heat sink (LOHSA), as well as inadvertent reactivity insertions and fusion source excursion are being analyzed using the RELAP5-3D code, the ATHENA version of which includes liquid metal coolants.

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Date submitted: 13 Jul 2009

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