Abstract Submitted
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Fusion Nuclear Science Facility (FNSF) motivation and required capabilities[1] Y.K.M. PENG, J.M. PARK, J.M. CANIK, S.J. DIEM, A.C. SONTAG, A. LUMSDAINE, M. MURAKAMI, Y. KATOH, T.W. BURGESS, K. KORSAH, B.D. PATTON, J.C. WAGNER, G.L. YODER, M.J. COLE, ORNL, UT-Battelle, P.J. FOGARTY, IDC, Inc., M. SAWAN, Univ. Wisconsin — A compact (R_0 ~1.2-1.3m), low aspect ratio, low-Q (<3) Fusion Nuclear Science Facility (FNSF) was recently assessed to provide a fully integrated, D-T-fueled, continuously driven plasma, volumetric nuclear environment of copious neutrons. This environment would be used to carry out, *for the first time*, discovery-driven research in fusion nuclear science and materials, in parallel with and complementary to ITER. This research would aim to test, discover, and understand new nuclear-nonnuclear synergistic interactions involving plasma material interactions, neutron material interactions, tritium fuel breeding and transport, and power extraction, and innovate and develop solutions for DEMO components. Progress will be reported on the fusion nuclear-nonnuclear coupling effects identified that motivate research on such an FNSF, and on the required capabilities in fusion plasma, device operation, and fusion nuclear science and engineering to fulfill its mission.

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Y.K.M. Peng
ORNL, UT-Battelle

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