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**FuZE Compact Fusion Device - Scaling the sheared-flow stabilized pinch to reactor conditions**[1] H.S. MCLEAN, D. P. HIGGINSON, J.M. MITRANI, K.K. TUMMEL, C. GOYON, Lawrence Livermore National Laboratory, T.R. WEBER, E.L. CLAVEAU, Z.T. DRAPER, E.G. FORBES, B. HENDERSON, A.D. STEPANOV, Y. ZHANG, University of Washington, Seattle, WA, B.A NELSON, B. CONWAY, U. SHUMLAK, Zap Energy Inc. — The University of Washington, Lawrence Livermore National Laboratory, and now Zap Energy Inc, have partnered under ARPA-E to advance the sheared-flow stabilized (SFS) Z-pinch concept and assess its potential for scaling to fusion conditions. The Fusion Z-pinch Experiment (FuZE) expands on UW's ZaP and ZaP-HD SFS devices by employing higher power-handling electrodes, flexible gas injection, and independently-switched capacitor bank modules to provide flexible tailoring of the discharge current and distribution of gas to establish the required plasma flow and pinch current. An extensive set of diagnostics provide key measurements. Experimental campaigns are underway to increase the pinch current, duration of pinch stability, and DD fusion neutron production guided by both fully-kinetic and continuum-based computer simulations. These efforts aim to understand the underlying science of scaling this concept to the pinch current, plasma density, and plasma temperature required for a compact, low-cost fusion reactor.

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