Abstract Submitted
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Integrated diagnostics suite to optimize neutron measurements on the MJOLNIR dense plasma focus CHRISTOPHER COOPER, E. ANAYA, M. ANDERSON, G. BARTOLO, S. CHAPMAN, O. DRURY, C. GOYON, D.P. HIGGINSON, A. LINK, Y.A. PODPALY, A. POVILUS, A.E. SCHMIDT, Lawrence Livermore National Laboratory, D. CHIPMAN, A. DURAND, D. MAX, Mission Support and Test Services — An integrated neutron diagnostics suite is developed for the 3 MA MJOLNIR dense plasma focus (DPF) that emphasizes collective functionality over individual measurements. Instead of merely maximizing yield, the unique mission space motivates new success metrics such as radiation pulse width and spot size, necessitating more intricate diagnostics. Radiation diagnostics diagnose neutron flux and timing: A PMT-coupled scintillator 6 m away and SIPM-coupled scintillators 2 m away provide information about the neutron flux envelope. Beryllium, Bromine, and Yttrium activation detectors monitor the yield, the scattering contribution, and the dose. An in-vessel diamond radiation detector monitors X-ray signals for multiple pinches which can spread the neutron flux envelope. A 16-frame, 3 ns exposure framing camera monitors pinch stagnation and breakup time and location. These data are synchronized with the neutron information to calculate neutron fluence. Light gates along the anode corroborate the rundown velocity and will be used in the future to synchronize diagnostics with the neutron arrival time by monitoring positions along the run-in. Prepared by LLNL under Contract DE-AC52-07NA27344.

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