Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

R-Z Density Mapping and CFD Simulation of Gas Puff Nozzle Flow ERIK MCKEE, UNR, JULIO VALENZUELA, IGOR KRASHENINNIKOV, UCSD, ALISTER FRAZIER, AARON COVINGTON, UNR, FARHAT BEG, UCSD, TIM DARLING, UNR, NEVADA TERAWATT FACILITY TEAM, UNIVERSITY OF SAN DIEGO TEAM — Laser induced fluorescence (LIF) is a technique in which a tracer is added to the gas flow for measurement of its spatial and temporal density profile. The Nd:YAG EKSPLA laser 20mJ/150ps at the fourth harmonic 266nm wavelength is focused down to a ¡1mm pencil beam to excite the acetone tracer. The use of anr ICCD gating camera is necessary because the 4ns short-lived fluorescence state is an order-of-magnitude dimmer than the 200us long-lived phosphorescence state. Mapping the density profile in time and space requires multiple shots. Once the temporal and spatial density profile is obtained, it can be used and benchmarked for two independent CFD software programs using transient solvers: OpenFOAM and FLUENT. The measurements and simulations serve as the initial conditions for (i) Gas Puff experiments that utilize special nozzle contours to inject the gas load between the electrode gap on pulsed-power machines and (ii) use with future MHD modeling efforts. Support for this work is provided by DOE/NNSA grant DE-NA0002075 and funded by the US Department of Energy, ARPA-E, Control Number 1184-1527

Erik McKee
UNR

Date submitted: 24 Jul 2015 Electronic form version 1.4