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Shattered Pellet Injection (SPI) assimilation and superposition on DIII-D[1] J. L. HERFINDAL, D SHIRAKI, L. R. BAYLOR, Oak Ridge National Laboratory, I BYKOV, R MOYER, E. M. HOLLMANN, University of California San Deigo, N EIDIETIS, General Atomics — Shattered Pellet Injection (SPI) has been chosen as the baseline disruption mitigation system for ITER. However, many questions remain regarding its operation, particularly under the presently envisaged operating scenario where several SPIs may need to be superimposed in order to inject massive quantities of deuterium prior to the thermal quench for runaway electron suppression. Simultaneous injection of two shattered pellets exhibit a reduction in the pre-thermal quench time (time from when SPI fragments reach the plasma edge until the start of the thermal quench), relative to similar single SPI mitigated shutdowns. Despite the decreased time to assimilate the injected impurities, the electron density increased by approximately a factor of two with the addition of multiple pellets but is highly sensitive to the time between injections. A maximum density increase is found when both pellets arrive at the plasma prior to the start of the TQ. The radiation cooling code KPRAD has been modified to simulate SPI shutdowns, with the ability to incorporate arbitrary pellet composition mixtures and multiple SPIs into the same discharge. Simulations agree well with experimental measurements, reproducing the electron density increase in dual SPI experiments.

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Jeffrey Herfindal
Oak Ridge National Laboratory

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