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Diagnosis and Modeling of Radiation during Massive Helium Gas Injection Disruption Mitigation on DIII–D[1] D.G. WHYTE, University of California, San Diego, T.C. JERNIGAN, Oak Ridge National Laboratory, T.E. EVANS, D.A. HUMPHREYS, A.G. KELLMAN, R.L. LEE, P.L. TAYLOR, General Atomics — Disruption mitigation by massive helium gas injection ($\sim 10^{23}$ He atoms in 9 ms) is studied on DIII–D. Fast XUV and visible spectroscopy are used to diagnose the evolution of the He radiation in the plasma. The signatures of plasma volume recombination in the dense core plasma ($n_e \sim 10^{21}$ m^{-3}) can be used to deduce the ionization/recombination fraction and electron temperature. Preliminary results show that in $\sim$ 2–3 ms the core plasma is cooled from $T_e > 1$ keV to $T_e \sim 5$ eV, and becomes dominated by recombination. During aVertical Displacment Event (VDE) XUV He spectroscopy can be used to determine T_e, Z_{eff} and hence resistivity in the halo plasma. This will allow for the first quantitative benchmarking of the inferred resistivity from simulated current quench and halo current time histories. Time-dependent radiation and energy balance modeling will be carried out using the KPRAD numerical code.

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[X] Prefer Oral Session
[ ] Prefer Poster Session

Special instructions: DIII–D Oral Session II, immediately following Stacey

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