Measurement of runaway electron energy distribution function during high-Z gas injection into runaway electron plateaus in DIII-D

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Abstract. The evolution of the runaway electron (RE) energy distribution function f_ε during massive gas injection into centered post-disruption runaway electron plateaus has been reconstructed. Overall, f_ε is found to be much more skewed toward low energy than predicted by avalanche theory. The reconstructions also indicate that the RE pitch angle θ is not uniform, but tends to be large at low energies and small $\theta \sim 0.1$ - 0.2 at high energies. Overall power loss from the RE plateau appears to be dominated by collisions with background free and bound electrons, leading to line radiation. However, the drag on the plasma current appears to be dominated by collisions with impurity ions in most cases. Synchrotron emission appears not to be significant for overall RE energy dissipation but may be important for limiting the peak RE energy.

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