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Self-consistent modelling of electron runaway during tokamak disruptions TUNDE FULOP, LINNEA HESSLOW, OLA EMBRUS, MATHIAS HOPPE, OSKAR VALLHAGEN, LUCAS UNNERFELT, Chalmers University of Technology — Recent progress in modelling the dynamics of runaway electrons (REs) during disruptions mitigated by massive material injection indicate a substantial increase in the avalanche multiplication gain during an ITER current quench compared to previous estimates [Hesslow et al, Nucl. Fusion 59, 084004 (2019)]. This is due to the increased number of target electrons available for the avalanche process in weakly ionized plasmas, which is only partially compensated by the increased friction force on REs. This results in more stringent requirements either on the maximum runaway seed population that can be allowed to survive the thermal quench, or on the density profile of the injected material needed to achieve successful mitigation. We present ongoing efforts to model runaway beam formation and evolution during the thermal quench and the development of a reduced kinetic model for RE dynamics in the presence of material injection.

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