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Progress and challenges in predictive modeling of runaway electron generation in ITER DYLAN BRENNAN, Princeton University, EERO HIRVIJOKI, CHANG LIU, AMITAVA BHATTACHARJEE, Princeton Plasma Physics Laboratory, ALLEN BOOZER, Columbia University — Among the most important questions given a thermal collapse event in ITER is that of how many seed electrons are available for runaway acceleration and the avalanche process, how collisional and radiative mechanisms will affect the electron acceleration, and what mitigation techniques will be effective. In this study, we use the kinetic equation for electrons and ions to investigate how different cooling scenarios lead to different seed distributions. Given any initial distribution, we study their subsequent avalanche and acceleration to runaway with Adjoint and test particle methods. This method gives an accurate calculation of the runaway threshold by including the collisional drag of background electrons (assuming they are Maxwellian), pitch angle scattering, and synchrotron and Bremsstrahlung radiation. This effort is part of a new large collaboration in the US which promises to contribute substantially to our understanding of these issues. This talk will briefly review how this work contributes to this collaboration, and in particular discuss the technical challenges and open questions that stand in the way of quantitative, predictive modeling of runaway generation in ITER, and how we plan to address them.

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