Abstract Submitted
for the DPP15 Meeting of
The American Physical Society

Reaction of runaway electron distributions to radiative processes
ADAM STAHL, OLA EMBRÉUS, EERO HIRVIJOKI, ISTVÁN PUSZTAI, Department of Applied Physics, Chalmers University of Technology, Gothenburg, Sweden, JOAN DECKER, École Polytechnique Fédérale de Lausanne (EPFL), Centre de Recherches en Physique des Plasmas (CRPP), Lausanne, Switzerland, SARAH L. NEWTON, TÜNDE FÜLÖP, Department of Applied Physics, Chalmers University of Technology, Gothenburg, Sweden — The emission of electromagnetic radiation by a charged particle in accelerated motion is associated with a reduction in its energy, accounted for by the inclusion of a radiation reaction force in the kinetic equation. For runaway electrons in plasmas, the dominant radiative processes are the emission of bremsstrahlung and synchrotron radiation. In this contribution, we investigate the impact of the associated radiation reaction forces on the runaway electron distribution, using both analytical and numerical studies, and discuss the corresponding change to the runaway electron growth rate, which can be substantial. We also report on the formation of non-monotonic features in the runaway electron tail as a consequence of the more complicated momentum-space dynamics in the presence of radiation reaction.

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Date submitted: 10 Jul 2015 Electronic form version 1.4