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Numerical calculation of ion runaway distributions SARAH NEWTON, OLA EMBRÉUS, ADAM STAHL, EERO HIRVIJOKI, TÜNDE FÜLÖP, Chalmers Univ. Technology, Applied Physics — Ion acceleration by electric fields is of interest in many plasma scenarios. Limitations of analytic descriptions prevent their general use in following the evolution of such "runaway ion" populations. Therefore we have implemented an initial value solver, CODION, for the linearized ion drift kinetic equation, with a non-relativistic Fokker-Planck collision operator. A spectral-Eulerian discretization scheme is used for 2D velocity space. The background plasma is taken to be homogeneous and static, with arbitrary composition. We demonstrate the use of the numerical distribution function to study ion acceleration in solar flares and tokamak plasmas. The variation of the strength and duration of the electric field required to produce a significant fast ion population is illustrated. Low frequency magnetic activity, indicative of toroidal Alfvén eigenmode excitation, has been observed during tokamak disruptions. Taking typical disruption parameters, we show that accelerated bulk ions are unlikely to reach a sufficient velocity to provide the resonant drive.

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