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Magnetic field threshold for runaway generation in tokamak disruptions T. FÜLÖP, Chalmers University of Technology, Sweden, G. POKOL, Budapest University of Technology and Economics, Hungary, H.M. SMITH, P. HELANDER, Max-Planck-Insitut fur Plasmaphysik Greifswald, Germany — Due to a sudden cooling of the plasma in tokamak disruptions a beam of relativistic runaway electrons is sometimes generated, which may cause damage on plasma facing components. Experimental observations on large tokamaks show that the number of runaway electrons produced in disruptions depends on the magnetic field strength. In this work, two possible reasons for this threshold are studied. The first possible explanation for these observations is that the runaway beam excites whistler waves that scatter the electrons in velocity space and prevents the beam from growing. The growth rates of the most unstable whistler waves are inversely proportional to the magnetic field strength and it is possible to derive a magnetic field threshold below which no runaways are expected. The second possible explanation is the magnetic field dependence of the criterion for substantial runaway production determined by the induced electric field available and by the efficiency of the generation mechanisms. It is shown, that even in rapidly cooling plasmas, where hot-tail generation is expected to give rise to substantial runaway population, the whistler waves can stop the runaway formation below a certain magnetic field unless the post-disruption temperature is very low.

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