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Particle-In-Cell simulations of the oblique whistler heat flux instability. Scattering of the strahl electrons into the halo and heat flux regulation in the solar wind near the Sun. ALFREDO MICERA, Royal Observatory of Belgium; KU Leuven, ANDREI ZHUKOV, Royal Observatory of Belgium; Moscow State University, RODRIGO ALVARO LOPEZ, Universidad de Santiago de Chile, ELISABETTA BOELLA, Lancaster University; Daresbury Laboratory, MIARIA ELENA INNOCENTI, KU Leuven, MARIAN LAZAR, Ruhr-Universitt Bochum; KU Leuven, GIOVANNI LAPENTA, KU Leuven — The whistler heat flux instability is a collisionless kinetic process that is often invoked to explain the scattering of strahl electrons into halo (e.g. Maksimovic et al. 2005) and the resultant regulation of the heat-flux in the solar wind. However, its role in this respect is poorly understood. To shed light into this matter, we investigate the evolution of counter-streaming core and strahl electrons under conditions typically encountered in the solar wind near the Sun. We prove with two-dimensional PIC simulations that a parallel or oblique whistler heat flux instability can be excited, depending on the initial drift velocities of the two electron populations. We confirm that the impact of parallel whistler waves on the regulation of the electron heat flux and the pitch-angle scattering of strahl electrons is only marginal(e.g. Kuzichev et al. 2019). On the contrary, we observe for the first time that the oblique whistler waves produce enhanced pitch-angle scattering of suprathermal electrons resulting in the transfer of a significant fraction of strahl electrons into the halo. The process is accompanied by a substantial reduction of the heat flux carried by the field-aligned strahl electrons.

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