Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Stability analysis of electron core-strahl solar wind distributions[1]
JACK SCHROEDER, STANISLAV BOLDYREV, University of Wisconsin - Madison — In this work, we perform kinetic stability analysis of a solar wind electron distribution made up of core and strahl subpopulations. Following up from work in (Horaites et. al. 2018), the core population is modeled as a drifting Maxwellian and the strahl population by an analytic expression derived in (Horaites et. al. 2019) from a drift kinetic equation. The expression for the strahl distribution used in this work differs from the previous work as the equation generalizes to electrons at all energies rather than a limiting case of suprathermal particles. Stability analysis is performed with the LEOPARD solver (Astfalk et. al. 2017), a linear dispersion solver that inputs arbitrary gyrotropic distribution functions for a magnetized plasma. Stability of kinetic Alfven, magnetosonic, and whistler modes is accessed at oblique angles of propagation at a range of spacial scales. Whistler turbulence has been invoked as a source of anomalous scattering of strahl electrons, so particular interest is taken in whistler modes. (1) Astfalk P., Jenko F., 2017, JGR (Space Phys.), 122, 89. (2) Horaites K., Astfalk P., Boldyrev S., Jenko F., 2018, MNRAS 480, 1499-1506. (3) Horaites K., Boldyrev S., 2019, MNRAS 489, 3412–3419.

[1]This work is supported by NSF under Grant NSF PHY-1707272, by NASA under Grant NASA 80NSSC18K0646, and by the Wisconsin Plasma Physics Laboratory (US Department of Energy Grant DE-SC0018266).

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Date submitted: 29 Jun 2020 Electronic form version 1.4