Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

The Effects of Non-Equilibrium Features on Solar Wind Plasma Evolution JADA WALTERS, KRISTOPHER KLEIN, University of Arizona, DANIEL VERSCHAREN, University College London, MICHAEL STEVENS, Smithsonian Astrophysics Observatory, JENNY VERNIERO, University of California Berkeley, PSP/SWEAP SCIENCE TEAM COLLABORATION — Typical treatments of plasma waves assume a hot, drifting bi-Maxwellian distribution function, but distribution functions observed in the solar wind often contain significant departures from this idealized model.This project investigates how these departures from an idealized bi-Maxwellian distribution function affects the onset and evolution of microinstabilities. To this end we use the Arbitrary Linear Plasma Solver (ALPS) to find the parameters of the expected waves using actual proton distributions measured by the Wind spacecraft. These parameters are then compared to the results from a bi-Maxwellian fit of the same proton distributions. By doing this, we can quantify how important these non-equilibrium features are to the evolution of the plasma. We plan to apply this analysis to proton distributions observed by Parker Solar Probe to gain insight into the different plasmas observed closer to the Sun, but this method could be applied to determine the effects of non-equilibrium features of the distribution function in a variety of physical contexts.

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Date submitted: 01 Jul 2020 Electronic form version 1.4