

SOLAR WIND MAGNETIC FLUCTUATIONS and ELECTRON NON-THERMAL TEMPERATURE ANISOTROPY: SURVEY of WIND-SWE-VEIS OBSERVATIONS

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© 2016. The American Astronomical Society. All rights reserved. The solar wind electron velocity distribution function (eVDF) exhibits a variety of non-thermal features that deviate from thermal equilibrium. These deviations from equilibrium provide a local source for electromagnetic fluctuation emissions, including the commonly observed electron whistler-cyclotron and firehose instabilities. We present a systematic analysis of Wind-SWE-VEIS observations of solar wind electron plasma and associated Wind-MFI observed magnetic fluctuations. For the first time using the full solar wind electron distribution and its moments, without separation of the various electron components, we show clear evidence that the temperature anisotropy threshold of the parallel electron cyclotron anisotropic instability bounds solar wind electrons during slow solar wind periods. We also demonstrate that during periods of slow solar wind, collisions - while infrequent - are the dominant mechanism by which sola