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The relative heating of ions and electrons due to turbulent dissipation through Landau damping NIRANJANA SHANKARAPPA, KRISTOPHER KLEIN, MIHAILO MARTINOVI, EMILY LICHKO, University of Arizona, PSP/FIELDS SCIENCE TEAM TEAM, PSP/SWEAP SCIENCE TEAM TEAM — The relative heating of ions and electrons due to turbulent dissipation plays a crucial role in the thermodynamics in many weakly collisional plasmas, including the solar wind. Previous works have evaluated the radial profile of these heating rates as a function of the distance from the Sun using data from in situ observations made by missions including Helios, Ulysses, and Voyager, making a variety of theoretical assumptions regarding the turbulent distribution of power and the accessible damping mechanisms. These in situ measurements of the solar wind have been limited to a heliocentric distance of greater than 0.29 au from the Sun's surface. Parker Solar Probe (PSP) will eventually provide such measurements down to 0.046 au. One particular theoretical model, developed in Howes et al 2008 and expanded in Kunz et al 2018, determines relative heating rates as a function of proton and electron anisotropic temperatures and plasma beta for a steady-state cascade of wavevector anisotropic turbulent fluctuations when dissipation is mediated through Landau damping. We apply this model to observations from the first two perihelion of PSP, characterizing how the relative heating rates vary as a function of radial distance, plasma parameters, and solar wind source, illuminating how energy is partitioned in the young solar wind.

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