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# Hybrid-Vlasov simulations of ion velocity distribution functions within Kelvin-Helmholtz vortices

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The Kelvin-Helmholtz instability (KHI) is a ubiquitous fluid instability in space plasmas. At the flanks of Earth's magnetopause, the KHI can typically develop during periods of northward interplanetary magnetic field, and it drives the solar wind-magnetosphere mass/energy transfer in the absence of dayside magnetic reconnection. We use local 2D-3V hybrid-Vlasov simulations to study the ion velocity distribution functions (VDFs) associated with the KHI in a magnetopause-like setup. Our results indicate that when the KHI enters the non-linear stage, the ion VDFs in the region perturbed by the instability become increasingly non-Maxwellian. The degree of non-Maxwellianity increases along with the magnitude of the density jump across the KHI boundary. We assess the impact of the non-Maxwellian ion VDFs on the development of the KHI, and compare the simulated VDFs with those observed by the Magnetospheric Multiscale Mission.