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Kinetic features revealed by top-hat electrostatic analysers: numerical simulations and instrument response results

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Turbulence Heating ObserveR (THOR) is the first mission devoted to study energization, acceleration and heating of turbulent space plasmas, and designed to perform field and particle measurements at kinetic scales in different near-Earth regions and in the solar wind. Solar Orbiter (SolO), together with Solar Probe Plus, will provide the first comprehensive remote and in situ measurements which are critical to establish the fundamental physical links between the Sun's dynamic atmosphere and the turbulent solar wind. The fundamental process of turbulent dissipation is mediated by physical mechanism that occur at a variety of temporal and spatial scales, and most efficiently at the kinetics scales. Hybrid Vlasov-Maxwell simulations of solar-wind turbulence show that kinetic effects manifest as particle beams, production of temperature anisotropies and ring-like modulations, preferential heating of heavy ions. We use a numerical code able to reproduce the response of a typical electrostatic analyzer of top-hat type starting from velocity distribution functions (VDFs) generated by Hybrid Vlasov-Maxwell (HVM) numerical simulations. Here, we show how optimized particle measurements by top-hat analysers can capture the kinetic features injected by turbulence in the VDFs.