Abstract Submitted
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Modeling Non-thermal Ions in the Heliosphere[1] NIKOLAI POGORELOV, MATTHEW BEDFORD, Department of Space Science and CSPAR, University of Alabama in Huntsville, IGOR KRYUKOV[2], CSPAR, University of Alabama in Huntsville, GARY ZANK, Department of Space Science and CSPAR, University of Alabama in Huntsville — Interactions of flows of partially ionized, magnetized plasma are frequently accompanied by the presence of both thermal and non-thermal components in the ion distribution function. If a non-thermal component of ions is formed due to charge exchange and collisions between the thermal ions and neutrals, it experiences the action of magnetic field, its distribution function is isotropized, and it soon acquires the bulk velocity of the ambient plasma without being thermodynamically equilibrated. This situation, e.g., takes place in the outer heliosphere – a part of the solar plasma region beyond the solar system whose properties are determined by the solar wind (SW) interaction with the local interstellar medium (LISM). We describe a new physical model of the SW flow suitable for description of the SW–LISM interaction involving thermal and nonthermal ion components. This approach is incorporated into a suite of computer codes developed at the University of Alabama in Huntsville (MS-FLUKSS, Multi-Scale FLUid-Kinetic Simulation Suite). We compare results of our modeling with direct measurements made by the fleet of NASA's near-Earth spacecraft and Voyagers providing data from the SW region beyond the heliospheric termination shock and the heliopause.

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