DYNAMICAL PROCESSES IN THE SOLAR WIND INTERACTION WITH THE CIRCUM-HELIOSPHERIC INTERSTELLAR MEDIUM

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A fundamental requirement for understanding the structure of the heliosphere and the propagation of energetic particles and cosmic rays is the ability to predict the 3D configuration of the plasma and magnetic fields at large distances at all phases of the solar cycle. The fundamental difficulty is that one requires knowledge of the plasma and magnetic fields as a function of time on some 3D surface near the Sun, the inner boundary conditions. At present, there is no way to determine these conditions completely. Nevertheless, there are some approximation methods and specific problems that can lead to considerable progress using the contemporary 3D, multi-fluid and MHD-kinetic models.

In this presentation, I show the results of numerical modeling of the solar-cycle effects on the distribution of plasma and neutral hydrogen properties in the outer heliosphere – the region of space determined by the solar wind (SW) interaction with the circum-heliospheric interstellar medium (CHISM). The processes which are taken into account include periodic variations in the latitudinal extent of a slow SW and the angle between the Sun's magnetic and rotation axes. It is assumed that the vector of the interstellar magnetic field (ISMF) belongs to the hydrogen deflection plane (HDP) determined in the *SOHO* SWAN experiment. The accuracy of this choice is estimated by creating neutral hydrogen flow statistical deflection maps as H-atoms enter the inner heliosphere and produce the H glow – solar Lyα radiation resonantly backscattered by these atoms.

Propagation of a global merged interaction region (GMIR) into the outer heliosheath is considered, where it initiates physical processes resulting 2–3 kHz radio emission. Using conditions for generation of this emission, we make an attempt to determine the distribution of radio emission sources and compare them with *Voyager* observations.