Statistical properties of the energetic ion and solar wind fluxes as a function of their amplitudes in front and behind of the shocks in the distant heliosphere

M. Zeldovich (1), Yu.I. Logachev (1), **I. Veselovsky** (1, 2)

(1) Institute of Nuclear Physics, Moscow State University, Moscow, Russia, (2) Institute of Space Research (IKI), Russian Academy of Sciences, Moscow, Russia
(veselov@dec1.sinp.msu.ru / Fax: 7(495)939-3553 / Phone: 7(495)939-1298)

Voyager 1,2 measurements of the solar wind and ion fluxes in the energy range $\sim$ 0.1 – 2 MeV/nucl obtained up to 2005 in the distant heliosphere are investigated in front and behind shock waves travelling from the Sun. Generally, log normal distributions are found to be better fittings of amplitudes as function of the flux intensity in the first case and Gaussian distributions in the second one. The comparison of the 1991 and 2004 events has been performed. The event of December 2004 is of the same type and does not differ in this sense from other propagating heliospheric shocks. We discuss the scenario that termination of the heliosphere and the solar wind transition to the interstellar medium are essentially non-steady state phenomena. The current concepts of the quasi-steady transition regions is not adequate for their description because of large heliospheric sizes and resulting low Strouhal numbers for space-time variations. These variations can be induced by the distinct solar activity phenomena and partially correlate with them. The contribution of possible interstellar medium time variations to observed properties in the outermost parts of the heliosphere at $\sim$100 A.U. is not excluded, but not known.