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Intensities of backscattered solar Lyman-alpha radiation: comparison of kinetic models with SOHO/SWAN data

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Solar Lyman-alpha photons are scattered by the interstellar hydrogen in the interplanetary medium. Therefore, being measured the backscattered solar Lyman-alpha radiation reveals properties of the interstellar hydrogen gas in the interplanetary medium. These properties, in turn, depends on both the local interstellar medium (LISM) parameters and the solar wind (SW)/LISM interaction. In this paper we model full sky maps of the intensities of the backscattered Lyman-alpha at 1 AU and compare these theoretical maps with those measured by SOHO/SWAN instrument. The comparison has been made for the entire period of the SOHO observations from 1996 to 2011.
To model the intensities maps we employed 3D time-dependent kinetic model of hydrogen distribution inside the heliosphere (Katushkina et al., 2011, 2012). This 3D time-dependent kinetic model includes the effects of the H atom perturbation in the SW/LISM interaction region as well as local ionization processes (solar radiation pressure, photoionization and charge-exchange). We consider different scenarios of the SW/LISM interaction by including and excluding the effects of the interstellar magnetic field.
Comparison of the model results with SOHO/SWAN data shows that there is a very good agreement during the solar minimum. Some systematic differences exist at the solar maximum. Possible reasons of these discrepancies are discussed.