

Helium can significantly influence solar wind dynamics. The changes of its relative abundance are usually associated with crossings of the boundaries between adjacent flux tubes. However, the recent studies of the data from the BMSW instrument onboard the Spektr-R spacecraft show that the relative helium abundance could vary also inside the flux tubes. The differential motion of proton and helium solar wind components was suggested as a source of turbulence inside the flux tube. The thesis is devoted to the long-term statistical study of the fast helium abundance variations with respect to parameters of the solar wind and changes of its source region. For this purpose, the plasma data from the instruments onboard the Wind and the Spektr-R spacecraft and magnetic field measurements from Wind were used. Simultaneous changes of the relative helium abundance and solar wind parameters were investigated in the long-term Wind observations as well as in the observations prior to and behind interplanetary shocks. Finally, the study of differences between proton and helium velocities during solar minima and solar maxima was conducted.