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Large- and medium-scale plasma transport in the Earth's magnetosphere and the formation of the spectra of magnetospheric turbulence

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The problem of the formation of large-scale and medium-scale spectra of magnetospheric turbulence is analyzed taking into account the turbulent transport of magnetospheric particles and filling of magnetic flux tubes by accelerated particles of ionospheric origin. Radial and azimuthal plasma pressure gradients are considered as the main sources of large and medium-scale electrostatic instabilities inside the magnetosphere. The self consistent problem of slow mode magnetosphere-ionosphere interactions is solved. Storm and substorm features of magnetospheric plasma transport are analyzed. The existence of the upper limit of the sharpness of plasma pressure distribution is discussed. Theory predictions are compared with the results of experimental observations.