

# Dusty plasmas and Schumann resonances on Earth and Mars

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We discuss possibility of excitation of Schumann oscillations on Mars in comparison with the Schumann oscillations in the atmosphere of the Earth. Dust plays significant role in the radiative and electrical processes in the ionosphere of Mars. Electrification in dust events such as dust devils and dust storms can presumably lead to electric fields large enough for discharges to take place and for existence of oscillations in Schumann cavity. Dust particles present in the atmosphere can influence on the surface temperature, the thunderstorm activity, and the dissipative properties of the ionosphere. In the atmosphere of Mars presence of large amount of dust particles can also influence the surface temperature and dissipative properties of the ionosphere in case when dust particles present at the ionospheric altitudes at high enough densities. As to the correlation between the surface temperature and the fundamental mode of the magnetic field of Schumann oscillations one cannot expect the same on Mars. The main source of energy for Schumann oscillations at the Earth is lightning. In rarified and arid atmosphere of Mars there are no analogues to strong convective meteorological clouds but increases the role of dust events. In Martian atmosphere lightning could probably be excited in dust events such as dust devils and dust storms. The energy released in thunderstorms depends on the frequency and intensity of lightning strokes. The number of dust devils in which the electric field reaches the breakdown value required for the amplitude of the Schumann resonances on Mars to be comparable to the amplitude of the Schumann resonances on Earth is obtained. The amplitude of oscillations in a Schumann cavity on Mars for the cases of dust devils and dust storms as sources of energy is estimated and compared with the parameters of the Schumann resonances on the Earth.