



## **Peaked electron distributions on Mars and possible mechanisms of their generation**

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The observations of the electron inverted 'V' structures by the MGS and MEX spacecraft, their resemblance to similar events in the Earth auroral regions, and the discovery of strong localized magnetic field sources of the crustal origin on Mars, suggested the existence of Martian aurora produced by the electron acceleration in the parallel electric fields. Following the theories of such type of structures on Earth we perform a scaling analysis to the Martian conditions. Due to much smaller magnetic fields as compared to the Earth case, the ionospheric Pedersen conductivity is much higher on Mars and the electric fields are strongly reduced. Auroral field tubes with parallel potential drops and relatively small cross scales to be adjusted to the scales of the localized crustal patches may appear only at the nightside. We also present statistical patterns of peaked electron distributions observed by the ASPERA-3 instrument in different magnetospheric regions and discuss alternative mechanisms of their generation.