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**Recent Discoveries on the Plasma Environment of Mars as seen by the Radar Sounder on MARS EXPRESS Spacecraft** FIRDEV S DURU, DONALD A. GURNETT, DAVID D. MORGAN, The University of Iowa — Mars Advanced Radar for Subsurface and Ionospheric Sounding (MARSIS), which is a low-frequency radar on Mars Express, is designed to study the subsurface and ionosphere of Mars. Here, we give an overview of the plasma environment of Mars as seen by MARSIS. With MARSIS, it is possible to obtain the electron densities with both remote sounding and local electron plasma oscillations. Remote sounding of the ionosphere revealed several types of echoes, including oblique echoes which arise from upward bulges in the ionosphere in regions where the crustal magnetic field of Mars is strong and nearly vertical. It is observed that the electron density profiles are in agreement with the Chapman photo-equilibrium model. Local density data revealed steep, transient electron density gradients similar to the ionopause commonly observed at Venus. It also showed that, at altitudes above 300 km, the electron density on the dayside is almost constant at a given altitude range and it increases exponentially with increasing altitude at a fixed solar zenith angle range.

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