

## RETRIEVAL OF AN INDUCED MAGNETIC FIELD IN MARS IONOSPHERE FROM MARSIS DATA. MODELS AND SIMULATIONS.

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### Introduction:

Evidence of an induced magnetic field in the ionosphere of Mars was measured indirectly through its effects on the electron density behaviour [1], based on the observations by the Mars Advanced Radar for Subsurface and Ionospheric Sounding (MARSIS) onboard Mars Express [2].

We have extended systematically the procedure used in [1], analysing the data for all orbits as measured by MARSIS during its ongoing mission.

The measures are in the form of ionograms representing the time delay of the echo of the signal as a function of the emitted frequency. From the inversion procedure of the ionospheric echos [3] it is possible to obtain the vertical electronic density and, from there and the cyclotronic frequencies of the inferred periodic electron trajectories, to deduce the modulus of the magnetic field at the spacecraft height.

That magnetic field can be due to fossile magnetic fields on the planet and to the induced effect of the charged particles of the solar wind.

We simulate the motion of charged particles in the magnetic using specific conservative techniques, considering the symmetry reduction of the Störmer model [5] as well as the general case [6,7]. The system is open to exhibit chaotic behaviour [8] that can be relevant to the confinement of particles trapped in the field.

### References:

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