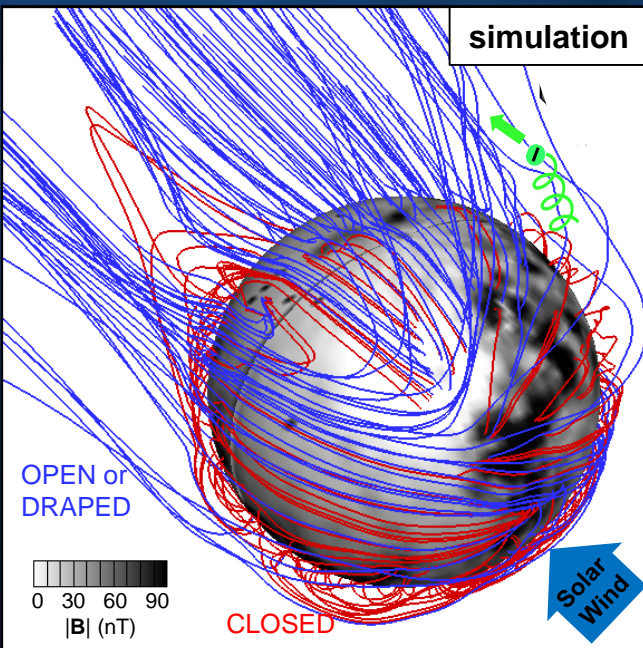


First 3-D Map of Mars Magnetic Topology

Data from instruments on MAVEN enable the first 3-D map of Mars' magnetic topology to be determined. Mars lacks a global intrinsic magnetic field.

- Mars' intense crustal magnetic sources gives rise to a complex magnetic topology. These fields either form closed loops (miniature magnetospheres) or connect with the interplanetary magnetic field to form cusps (bottom, left).
- MAVEN's Solar Wind Electron Analyzer and Magnetometer (SWEA/MAG), has shown that below 300 km altitude, closed magnetic loops dominate across the planet (lower right), over the weakly magnetized northern hemisphere.
- Open and draped field lines exist in the northern hemisphere (upper right).
- Magnetic topology is important for energy transport in Mars' upper atmosphere and ion loss to space, and helps .



Magnetic field lines from simulations. Closed loops are red; open or draped lines are blue. Electrons (green) spiral along field lines. The grayscale indicates the intensity of crustal magnetic sources at 105 km altitude.

Occurrence rate of closed field lines on the dayside in four altitude ranges. Contours indicate crustal magnetic field intensity.

Xu et al. [2017], JGR MAVEN Special Issue

