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 **PRESS RELEASE**

New study in Nature uncovers unexpected interaction between Mars and the solar wind


*A study, published in Nature, finds a new way that Mars can interact with the solar wind. The solar wind flows along the white lines, and atmospheric particles are lost to space along the red lines. Illustration & image: IRF*

**Scientists of the Swedish Institute of Space Physics (IRF) in Kiruna find that under certain conditions the induced magnetosphere of Mars can degenerate. The findings are presented in a new study, published in the renowned journal *Nature*.**

An induced magnetosphere is formed because of a planets lack of an internal magnetic field and instead the atmosphere of the planet interacts directly with the solar wind. The solar wind is a stream of charged particles from the Sun with an embedded magnetic field.

The scientists have been using computer models and observations from scientific instruments, as IRF's Analyzer of Space Plasmas and Energetic Atoms (ASPERA-3), onboard the ESA spacecraft Mars Express and NASA's spacecraft MAVEN, both of which orbit around Mars.

“*When the solar wind protons flow align with the magnetic field of the solar wind, the induced magnetosphere of Mars will degenerate. Such a degenerate magnetosphere will affect how much atmosphere is lost from Mars to space*”, says the lead author Qi Zhang, PhD student at IRF and Umeå University.

The results are published in the journal *Nature* on 18 September 2024.

The ASPERA-3 instrument measures the fluxes of ions, electrons and neutral atoms in space around Mars. During more than 20 years in orbit around the planet, ASPERA-3 has made a number of interesting observations at Mars, including continuous measurements of the ion outflow from the planet.

**Link to the article “*Mars’s induced magnetosphere can degenerate*” in Nature:**

<https://www.nature.com/articles/s41586-024-07959-z>

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