

## **Ion Escape Rates from Mars**

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The Mars Atmosphere and Volatile EvolutioN (MAVEN) mission has been making science measurements of the Martian upper atmosphere and its escape to space since November 2014. A key part of this effort is the measurement of the escape rates of charged particles (ions) at present and over solar system history. The lack of a global dynamo magnetic field at Mars leaves its upper atmosphere more directly exposed to the impinging solar wind than magnetized planets such as Earth. For this reason it is thought that ion escape at Mars may have played a significant role in long term climate change. MAVEN measures escaping planetary ions directly, with high energy, mass, and time resolution.

With more than two years of observations in hand, we will report the average ion escape rate and the spatial distribution of escaping ions as measured by MAVEN, including escape as a function of mass and energy. We will then report on the measured variability in ion escape rates with different drivers (e.g. solar EUV, solar wind pressure, etc.). We will use these results to provide an estimate of the total ion escape from Mars over billions of years, and discuss the implications for Mars and unmagnetized planets in general.