Mars rover Curiosity's measurements of Martian atmosphere reveal how atmosphere disappeared

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By arkar

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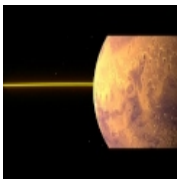
Clues on Mars' surface suggest the planet once had a denser atmosphere and liquid water



Even though NASA's Mars rover Curiosity is in standby mode, recent measurements taken by the rover have revealed startling new details about the Martian atmosphere.

The rover, which went into standby mode earlier this month following a "Solar Conjunction," in which the Red Planet moves behind the sun to effectively be blocked from direct communication with the Earth, has nonetheless continued gathering data about Mars, but this has been restricted to atmospheric and weather readings from its stationary position in the Yellowknife Bay at the equatorial Gale Crater, where it landed last August. From this position, the Mars Science Laboratory (MSL) was able to gather important data regarding Mars' atmosphere, determining just what happened with the Martian atmosphere.

For its measurements, the MSL analyzed the different types of argon atoms found in the Martian atmosphere and discovered that there existed a greater amount of heavier isotopes in the atmosphere than lighters, suggesting that the Martian atmosphere literally escaped into space. According to scientists, some 95 percent of this atmosphere is believed to have evaporated into space. Curiosity analyzed the amounts of argon-36 and argon-38 and showed that the latter had built up more in the atmosphere than had lighter isotope.

Speaking about the analysis, Prof. Sushil Atreya, from the University of Michigan, said, "We've been waiting for this result for a long time. Argon is chemically inert. It does not interact with the surface; it does not exchange with the interior [of the planet]. So it's the cleanest, clearest signal of escape."

In order to carry out its measurements, Curiosity used one of its two onboard laboratories, the Sample Analysis at Mars (SAM) tool. This conducted its analysis of the Martian atmosphere by first flushing out all the gases that were already present in its chamber, flooding it instead with Martian atmosphere to boost the levels of argon. The analysis yielded a ratio of 4.2 argon-38 atoms to every 1 argon-36 atoms - which suggested that the Martian atmosphere was slowly stripped away with the absence of a magnetic field, allowing for lighter gases to be blown away into space by solar winds.

Prof. Atreya added, "We've been seeing the same kind of behaviour in the carbon dioxide isotopes and the water isotopes - they're all telling us the same story; that gases have been escaping from Mars over time, and the argon isotope just really nails it."

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  SAM's duty is to analyze gases that are either "sniffed" directly from the Martian atmosphere (which it has done several times) or extracted from soil or powdered rock samples by heating or chemically treating the samples. Provided by