

What will Voyager 1 discover at the bow of the solar system?

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Artist's concept of NASA's Voyager spacecraft. Credit: NASA/JPL-Caltech

As the Voyager 1 spacecraft approaches the very edges of our solar system, space scientists await to see if it will discover the solar system's 'bow shock'; a theorized pile up of gas, dust, and cosmic rays, which accumulate as the solar system moves through interstellar space.

In space, a bow shock is similar to the shockwave formed ahead of the wing of a plane or the bow of a moving ship. They are often formed when a solar wind encounters a planet's magnetic field. Earth has a thin bow shock formed approximately 90,000 km ahead of the planet.

Just as planets move throughout the solar system, the system itself is moving through the Milky Way. As it travels, the Sun's magnetic field interacts with the interstellar magnetic field and the mix of dust and gas that permeates deep space. Scientists believe the bow shock builds ahead of the leading edge of the solar system as it travels through the cosmos and the gas, dust, and cosmic rays of the [interstellar medium](#) slow down and pile up.

While NASA research seemed to refute its existence, new research in *Geophysical Research Letters* found that the bow shock likely exists after all. The authors claim the solar system's bow shock would be different to Earth's, describing it as a "slow [bow shock](#)."

More information: Citation: B. Zieger and M. Opher, N. A. Schwadron, D. J. McComas, G. Tóth, "A slow bow shock ahead of the heliosphere", *Geophysical Research Letters*, DOI: [10.1002/grl.50576](https://doi.org/10.1002/grl.50576), 2013. [onlinelibrary.wiley.com/doi/10 ... 2/grl.50576/abstract](https://onlinelibrary.wiley.com/doi/10.1002/grl.50576/abstract)

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