Uncommon Moons

The next time you take a moonlit stroll, or admire a full, bright-white moon looming in the night sky, you might count yourself lucky. Observations from NASA's Spitzer Space Telescope suggest that moons like Earth's are uncommon in the Universe. Hello, I'm Daniel Brennan.

This Spitzer Space Telescope podcast is part of a series highlighting recent discoveries in infrared astronomy. It's produced by NASA's Spitzer Science Center at the California Institute of Technology in Pasadena. The Spitzer mission is managed by NASA's Jet Propulsion Laboratory.

It's hard to imagine Earth without a moon. Our familiar white orb has long been the subject of art, myth and poetry. Wolves howl at it, and humans have left footprints in its soil. Life itself might have evolved from the ocean to land thanks to tides induced by the moon's gravity.

Earth's moon formed out of a tremendous collision about 30 to 50 million years after our sun was born, after our rocky planets had begun to take shape. A body as big as Mars is thought to have smacked into our infant Earth, breaking off a piece of its mantle. Some of the resulting debris fell into orbit around Earth, eventually coalescing into the moon we see today.

The other moons in our solar system either formed simultaneously with their planet or were captured by their planet's gravity.

According to Nadya Gorlova of the University of Florida, Gainesville, lead author of a new study, when a moon forms from a violent collision, dust should be blasted everywhere. If there were lots of moons forming, Spitzer should see dust around lots of stars. However, the team found that was not the case.

Gorlova and her colleagues looked for the dusty signs of similar smash-ups around 400 stars that are all about 30 million years old -- roughly the age of our sun when Earth's moon formed. They found that only 1 out of the 400 stars is immersed in the telltale dust. And the team is quick to point out that even in systems where such collisions occur, not all of them will result in the formation of a moon. Taking into consideration the amount of time the dust should stick around, and the age range at which moon-forming collisions can occur, the scientists then calculated the probability of a solar system making a moon like Earth's to be at most 5 to 10 percent.

In addition, the observations tell astronomers that the planet-building process itself winds down by 30 million years after a star is born. Like our moon, rocky planets are built up through messy collisions that spray dust all around. Current thinking holds that this process lasts from about 10 to 50 million years after a star forms. The fact that Gorlova and her team found only 1 star out of 400 with collision-generated dust indicates that the 30-million-year-old stars in the study have, for the most part, finished making their planets.

For moon lovers, the news isn't all bad. For one thing, moons can form in different ways. And, even though the majority of rocky planets in the universe might not have moons like Earth's, astronomers believe there are billions of rocky planets out there. Five to 10 percent of billions is still a lot of moons.

For the Spitzer Science Center, I'm Daniel Brennan.

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