



VOYAGER DATA SUGGESTS THAT RADIATION COULD PENETRATE OUR SOLAR SYSTEM
 BY RICH BARLOW

The Porous Frontier

Merav Opher

CYDNEY SCOTT

IF YOU’VE DREAMED of volunteering for that manned flight to Mars that NASA is planning, better pack a good hazmat suit. New research by Merav Opher, a College of Arts & Sciences assistant professor of astronomy, and others suggests that the edge of our solar system may not be the radiation-deflecting shield scientists once thought it was.

Data transmitted from NASA’s Voyager probes, launched back when Jimmy Carter was president, indicate that the heliosheath, the region between our solar system and interstellar space, is less a shield than a porous brew of massive magnetic “bubbles” that offers little protection from cosmic rays, which can damage astronauts’ DNA and immune systems. And while rays pose no threat

to Earth dwellers, who are protected by our planet’s atmosphere, Opher believes that astronauts rocketing to Mars need to beware of radiation leaking in from outside our solar system.

If the findings, which were announced in June at a NASA press conference and in an *Astrophysical Journal* paper, are confirmed, the revelation would upend our

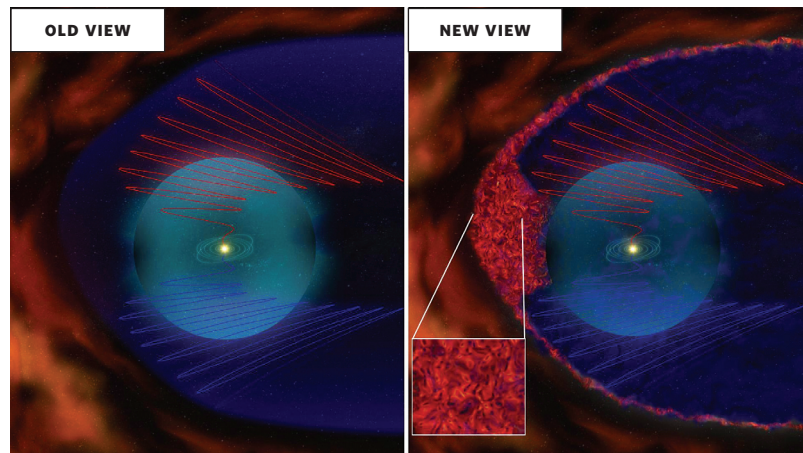
understanding of the solar system’s outer rim 10 billion miles away. For now, says Opher, “These findings are very important in the sense that we are learning about our home,” the region of the sun’s influence. “Related to a manned trip to Mars, it also has implications. Astronauts in long exposures can be affected by radiation coming from galactic cosmic rays.”

Opher, whose work is partially funded by NASA, says the new theory is based on a computer model built from Voyager data, but adds that the information from those 34-year-old spacecrafts really needs to be double-checked by newer, “more sensitive instruments.”

The two probes have documented wrenching variations in the amount of electrons in the heliosheath, roller-coaster readings that would comport with the existence of magnetic bubbles. The vast bubbles—100 million miles long and sausage-shaped—trap particles like electrons. As the probes enter a bubble, electron readings spike, then drop when the probes leave the bubble. The heliosheath lies at the edge of the magnetic field thrown across the solar system by the sun. The researchers speculate that the rotation of the sun creates folds in the field that break into bubbles. That region of space, Opher told PBS, can be likened to “a really agitated Jacuzzi.”

The bad news, she says, is that while the bubbles may trap cosmic rays for a time, the rays may escape and enter our solar system.

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 Old and new views of the solar system’s fringe: the newly identified “space bubbles” are shown in red on the image at right.



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