

# Researchers will follow in the moon's slipstream to capture high-res sunspot images

August 18 2017

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While much of the research around the eclipse on Monday will focus on the effects of the Sun's brief, daytime disappearance on Earth and its atmosphere, a group of solar physicists will be leveraging the rare event to capture a better glimpse of the star itself.

NJIT physicists Dale Gary and Bin Chen and collaborators will be observing sunspots—the visible concentrations of magnetic fields on the Sun's surface— at microwave radio wavelengths from NJIT's Expanded Owens Valley Solar Array (EOVSA) near Big Pine, Calif. and from the Jansky Very Large Array (VLA) radio telescope near Socorro, N.M, which is operated by the National Radio Astronomy Observatory. While neither site is in the path of totality, they will both have between 75 to 80 percent coverage.

"Radio waves from the [solar corona](#) have long wavelengths, and as resolution is proportional to wavelength, our images ordinarily have rather low spatial resolution. But we can capture sharper images as we move in the direction of the Moon's motion as it blocks different parts of the Sun at different times," explains Gary, a distinguished professor of physics at NJIT's Center for Solar-Terrestrial Research (CSTR), adding, "Radio waves are sensitive to the otherwise invisible corona of the Sun, especially its magnetic field, so we will use the eclipse to make high-resolution images of the corona above active regions."

Sunspots are the primary generator of solar flares, the sudden, powerful blasts of electromagnetic radiation and charged particles that burst into space during explosions on the Sun's surface. Their turning motion causes energy to build up that is released in the form of flares.

Gary says there is nothing inherently different about the coming eclipse as compared to previous events, but he notes that researchers who use radio telescopes will be able to observe it much more clearly this time.

"What is different is that both EOVSA and the VLA have much greater capabilities than in the past," he says, "so we expect much better radio images and more complete frequency coverage from which to deduce the magnetic field, temperature and density of the corona."

NJIT recently expanded the Owens Valley array, adding eight new antennas to the existing seven, and replacing the control systems and signal processing. The solar science to be addressed focuses on the magnetic structure of the solar [corona](#), on transient phenomena resulting from magnetic interactions, including the sudden release of energy and subsequent particle acceleration and heating, and on space weather phenomena.

Provided by New Jersey Institute of Technology

Citation: Researchers will follow in the moon's slipstream to capture high-res sunspot images (2017, August 18) retrieved 17 July 2024 from <https://phys.org/news/2017-08-moon-slipstream-capture-high-res-sunspot.html>

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