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New cameras can withstand space radiation

Future snapshots could reveal lakes, oceans on Jupiter's moon Europa

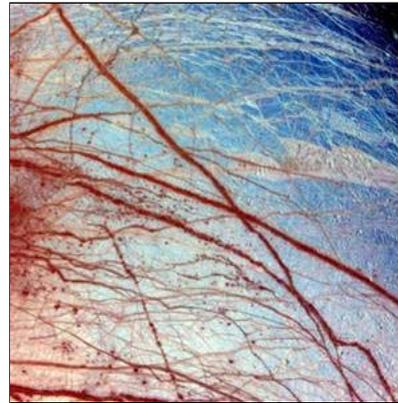
By Ben Mauk


updated 3:37 p.m. ET, Wed., Aug. 22, 2007

Future space snapshots could reveal the existence of lakes or oceans on Jupiter's moon Europa, suggesting the possibility of alien life, and astronomers have now built an imaging detector better up to the task.

Until now, the **imaging detectors** available to take pictures in space have been vulnerable to the noise and degradation caused by cosmic rays and other radioactive particles. Environments such as the one surrounding Europa are particularly radiation-heavy, making observations difficult.

"Radiation tolerant detectors are a critical need for NASA in **the continued exploration** of the solar system," said Melissa McGrath, chief scientist in the Science and Mission Systems Office at NASA Marshall Space Flight Center.



Nasa / NASA

Europa, a moon among many circling Jupiter, appears to have a putative ocean hidden under its frozen surface crust. Tougher cameras, however, will be necessary to scope out the water regions beneath its shell of ice.

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The technology driving the new detector is a capturing system that immediately converts electromagnetic signals into digital information, pixel by pixel. The method bypasses the standard pathway traveled by analog signals from sensors to the point where the signal is converted to digital data.

High-energy radioactive particles in space degrade these circuits, or pathways, over time and add to noise in the data by making pixels appear artificially bright.

The new device avoids such pitfalls, said project leader Donald Figer, director of the Rochester Imaging Detector Laboratory at Rochester

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Institute of Technology.

"Our detector converts the analog signal to a digital number within the pixel," Figer told *LiveScience*. "Radiation does not have time to affect the signal. And once the data is digitized it's essentially impossible to pick up noise."

The detector will also be less susceptible to charge traps that can build up in instruments under exposure to radiation, further degrading the signal.

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"The instrument's benefit will be greatest where the radiation environment is high," said Figer. The Jovian moons are one such area.

"We could ... figure out if there are lakes of water on **Europa** or hydrocarbons on Titan," Figer said, referring to the much-sought evidence that life might exist beyond our planet.

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