Because most or all of the signal photons would be correlated while most or all of the noise photons would be uncorrelated, the S/N would be correspondingly enhanced in the photodetector output. An additional advantage to be gained by use of a correlated-photon detector is that it could be capable of recovering the signal even in the presence of background light so bright that a classical uncorrelated-photon detector would be saturated.

A blocked-impurity-band (BIB) photodetector that preferentially detects pairs of correlated photons over uncorrelated ones and that operates at a quantum efficiency of 88 percent is commercially available. This detector must be cooled to the temperature of liquid helium to obtain the desired low-noise performance. It is planned to use this detector in a proof-of-principle demonstration. In addition, it may be possible to develop GaN-based photodetectors that could offer the desired low-noise performance at room temperature.

This work was done by Deborah Jackson, George Hockney, and Jonathan Dowling of Caltech for NASA's Jet Propulsion Laboratory. Further information is contained in a TSP (see page 1).

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dimmed (or missing) beacon, making it possible to continue to compensate for vibrations and other motions when the system is partially or totally blind to the beacon.

The time during which compensation can be maintained is limited by the accumulation of integration error since the last observation of the beacon at adequate intensity. Typical atmospheric fades last about 1 ms. It has been estimated that compensation could be maintained for times ranging from tens of milliseconds to tens of seconds, depending on the amount of pointing error that can be tolerated.

This work was done by Gerardo Ortiz and Shinhak Lee of Caltech for NASA’s Jet Propulsion Laboratory. Further information is contained in a TSP (see page 1).

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Curved Focal-Plane Arrays Using Back-Illuminated High-Purity Photodetectors

Advantages of curved-focal-surface imaging could be obtained at lower cost.

NASA’s Jet Propulsion Laboratory, Pasadena, California

Curved-focal-plane arrays of back-illuminated silicon-based photodetectors are being developed. The basic idea is to improve the performance of an imaging instrument and simplify the optics needed to obtain a given level of performance by making an image sensor (e.g., a photographic film or an array of photodetectors) conform to a curved focal surface, instead of following the customary practice of designing the optics to project an image onto a flat focal surface. Eyes are natural examples of optical systems that have curved focal surfaces on which image sensors (retinas) are located.