Science from Transit Follow-up Photometry and Spectroscopy

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Transits of extrasolar planets provide numerous opportunities to probe directly the physical properties of these worlds. In addition to mass and radius from the transit, thermal emission of the planets can be measured from the depth of the secondary eclipse. These measurements are most readily made using space-borne telescopes. Thermal emission detections, using Spitzer, have now been reported for four extrasolar planets. Interesting ground-based upper limits, and one tentative ground-based detection, of thermal emission at wavelengths shortward of the Spitzer bands have also been reported. The secondary eclipse technique can be extended to spectroscopy, allowing the measurement of the thermal emission spectrum of hot Jupiters. The James Webb Space Telescope will enable us to extend infrared photometry and spectroscopy to smaller and colder planets, including the potential measurement of the thermal emission spectra of earthlike planets transiting lower main sequence stars.