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Atmosphere of a Transiting Hot-Jupiter System, Probed in the Lyman-alpha Band LOUIS OBERTO, Pennsylvania State Univ, ZHENG ZHENG, University of Utah — A Jupiter-like extrasolar planet (i.e., a hot-Jupiter), close to the host star, can have an atmosphere extending to several times the planet radius, as a result of heating from the star. Such an extended atmosphere is transparent to visible light and hard to be observed in the optical band. However, in the Lyman-α band, the extended atmosphere can be detected, because of the interaction of Lyman-α photons with the neutral hydrogen atoms in the atmosphere. A fraction of the Lyman-α photons emitted from the star are intercepted by the planet, and these photons experience resonant scattering in the planet's atmosphere and eventually escape the atmosphere. Therefore, in the Lyman-α band, the planet appears to be effectively emitting light. We perform a Lyman-α radiative transfer study of a model transiting hot-Jupiter system. In the Lyman-α band, the transit signal is much stronger (compared to that in the optical band), due to the extended atmosphere. The effective Lyman-α emission from the planet also shows a phase variation as the planet orbits around the star. We investigate how the transit and phase-change light curve depends on the distribution of neutral hydrogen in the atmosphere, as well as the velocity of the atmosphere.

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