



11303 - Search for atmospheric absorption signatures of the "hot Jupiter" HD 209458b in HST archival data

Cycle: 16, Proposal Category: AR

(Availability Mode: SUPPORTED)

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VISITS

0 Total Orbits Used

ABSTRACT

The most extensively studied extrasolar planet, HD 209458b, is the first transiting planet ever discovered. This is a "hot Jupiter" planet largely heated by its close sun-like star. HST was the first to detect its lower atmosphere in NaI absorption during transit. HST far-UV observations also revealed a huge upper atmosphere with

escaping HI atoms, also containing OI and CII. Analysis of HST near-UV/visible observations has now identified Balmer continuum absorption by hot ($n=2$) HI atoms in a lower thermospheric layer where the hydrodynamic outflow develops (Ballester, Sing & Herbert, *Nature*, in press, 2007). This detection was made with archival STIS G430L transit spectra. Using the same data with other G750L transit data, the original observers have published accurate planetary radii at 10 photometric bandpasses across 290-1020 nm. The two shortest wavelength G430L bandpasses show significantly larger radii than the average value, and these are the same G430L data used in spectral form to identify the Balmer absorption. Two other bandpasses in the G750L data also show large planetary radii at the same significance as found for the two short-wavelength G430L bandpasses. They should thus also contain significant atmospheric absorption. We propose to analyze the spectral characteristics in the STIS dataset in order to identify the absorption signatures in the two identified G750L bandpasses. One bandpass may reveal absorption by water. We will search for absorption by species in both the lower and upper atmospheres, and compare the data with model calculations.