



Probing the atmosphere of the transiting hot Neptune GJ436b for water, methane and ammonia

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We present an analysis of seven primary transit observations of the hot Neptune GJ436b at 3.6, 4.5 and 8 microns obtained with the Infrared Array Camera (IRAC) on the Spitzer Space Telescope. After correcting for the well known systematic effects of the instrument, we fitted the light curves including limb darkening effects using Markov Chain Monte Carlo. Combining these data with the EPOXI, HST and ground-based H and K observations we are now spanning the range 0.5-8 microns. We compute a temperature profile adapted for the terminator of the planet using a three-dimensional, pseudospectral general circulation model with idealized thermal forcing. We compute the transmission spectra of GJ436b using line-by-line radiative transfer models based on molecular opacities from the BT2 line list for H₂O, HITRAN 2008 for Methane and a new, computed, infrared line list for hot NH₃. We find that Methane is the dominant species to shape the observed absorption spectra with possibly minor contributions of ammonia and water.