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# HST WFC3 G141 data analysis: exploring the transition from Super-Earth to Sub-Neptune

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Exoplanets with size between the Earth and Neptune (1-4R☐) do not have any equivalent in our Solar System and remain challenging to characterize. Yet, there are ubiquitous in the Galaxy and Fulton et al. (2017) showed that their distribution (number of planets per star vs radius) is bimodal highlighting a gap in the number of planets around 1.7R☐. Planets with a radius below 1.7R☐ are thought to be mostly rocky planets, and called Super-Earth, above this limit planets are most likely made of gas and called Sub-Neptune. We made use of the available data from the Hubble Space Telescope in Near-Infrared (HST WFC3 G141) and gathered 18 transmission spectra of planets with size below 6 R☐ to study the transition between rocky and gaseous planets. First, we used TauREx3 (Al-Refaie et al. 2019), a Bayesian retrieval code, to rule out atmospheric scenarios. We proved that a primary clear atmosphere dominated by Hydrogen and Helium is rejected with more than 3σ for a large majority of planets in the sample. Then, we measured the amplitude of the spectra in the water absorption band (around 1.4μm) and compared observational values to simulated ones using a self-consistent modeling code ExoREM (Baudino et al. 2015; Charnay et al. 2018). We explored the connection between the water absorption amplitudes and the temperature by setting the stellar and planetary parameters to those of HD 3167 c (2.7 R☐, 8.33 M☐) and trying different metallicities (1, 10, 100 and 1000 x solar), cloud compositions and temperatures (300-1200K).