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Extreme exoplanets as a tool to understand trends in exoplanets atmospheres.

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The interpretation of general trends in exoplanet atmospheres is challenging because they exhibit a wide range of diverse properties in terms of composition, structure, and overall atmospheric physics. In this context exoplanet's in extreme regimes can help to understand global planetary properties.

In this project, we focus on a few exoplanets that are outliers in their atmospheric properties and discuss what we can learn about the overall population of hot-jupiters from these peculiar objects. We present studies of exo-atmospheric processes in extreme regimes of temperature, of entropy, of radiative and advective timescales, and of formation stages. This project combines these various physical properties in a unique and innovative manner to understand the most crucial properties of hot-Jupiters.

Practically, we leverage the unique capabilities of Hubble Space Telescope Wide Field Camera 3 together with novel data analysis techniques to understand the nature of a set of exoplanets that reside under these extreme conditions. Ultimately, this project enable us to improve our understanding of exo-atmospheric processes and planet formation that ultimately shape the atmospheres of hot Jupiters that are observed today.