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Dynamics of Ionized Giant Planet Atmospheres

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Abstract

The nonlinear dynamics of ionized planetary atmospheres are presented. Both Solar System and Extrasolar System planets are considered, making use of knowledge gained from Earth and other Solar System ionosphere studies. Fundamental equations in the collision-dominated regime are discussed and high-resolution numerical simulations are presented in idealized settings. The focus is on elucidating mechanisms that control the dynamics and interactions of jets, vortices, waves, currents, and magnetic fields.