

STILES: the Impact of stellar XUV radiation on exoplanetary atmosphere evolution

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Exoplanets form and evolve in environments dominated by the presence of their host stars. In particular, the stellar high-energy radiation strongly affects the evolution of a planetary atmosphere in several ways. It can control the chemical composition of the atmosphere through photochemical processes, but it can also cause atmospheric heating. In the latter case, if enough energy is deposited, the atmosphere heats up and begins to expand, leading to a phase of hydrodynamic instability, and may also provide mass-loss to photo-evaporation. These events may shape the evolutionary history of planets and modify on a global scale the distribution of planetary populations.

Photoevaporation is regulated by metallicity that, when sufficiently high allows planets to retain atmospheres for longer, even in close-in orbits.

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