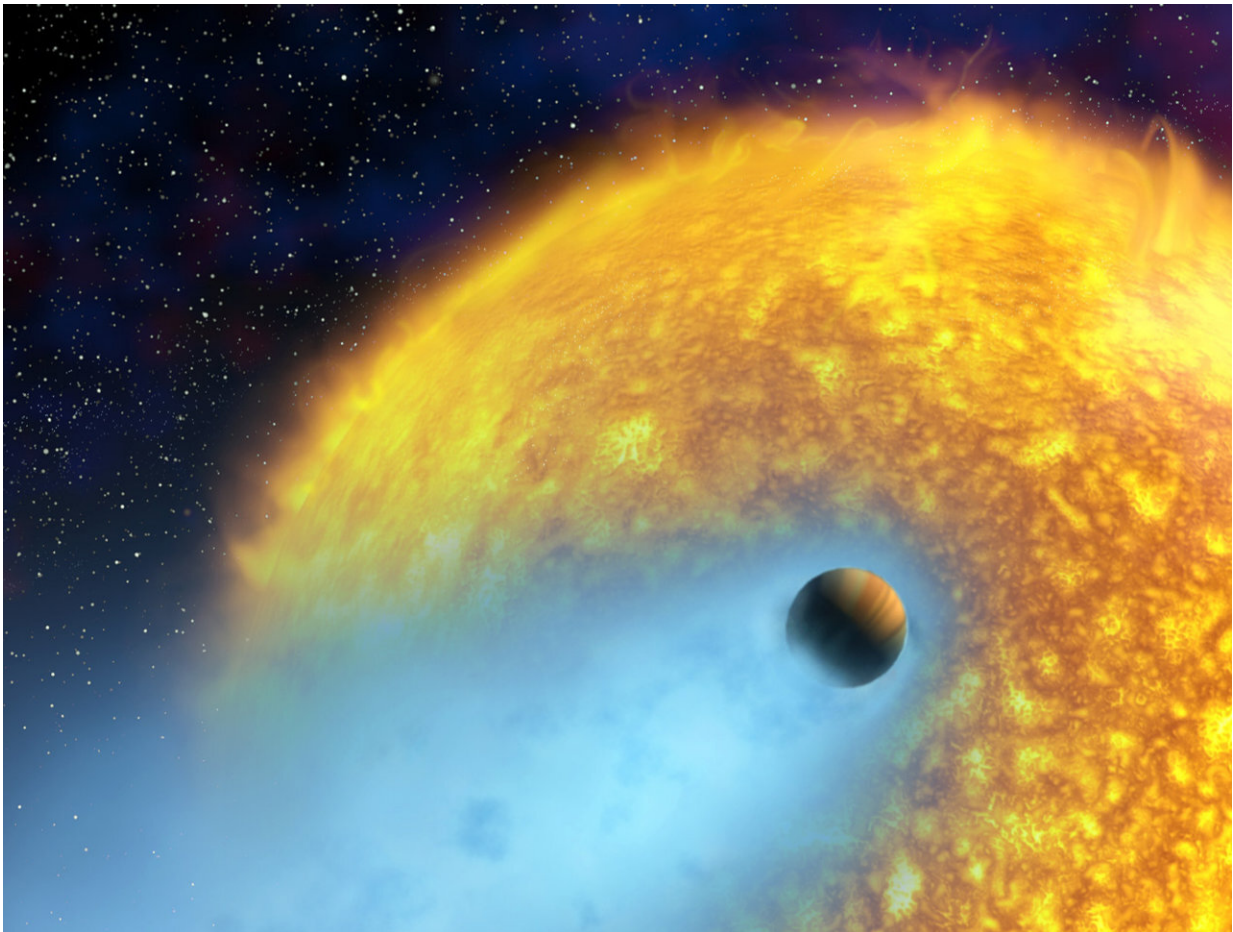


# Study finds stellar flares can lead to the diminishment of a planet's habitability

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An artist's conception of HD 209458 b, an exoplanet whose atmosphere is being torn off at more than 35,000 km/hour by the radiation of its close-by parent star. This hot Jupiter was the first alien world discovered via the transit method, and the first planet to have its atmosphere studied. Credit: NASA/European Space Agency/Alfred Vidal-Madjar (Institut d'Astrophysique de Paris, CNRS)

In a new study, a team led by research scientist Dimitra Atri of the Center for Space Science at NYU Abu Dhabi (NYUAD) identified which stars are most likely to host habitable exoplanets based on the calculated erosion rates of the planetary atmospheres.

In the paper titled "Stellar flares versus luminosity: XUV-induced atmospheric escape and planetary habitability," published in the journal *Monthly Notices of Royal Astronomical Society: Letters*, Atri and graduate student Shane Carberry Mogan have presented the process of analyzing [flare](#) emission data from NASA's Transiting Exoplanet Survey Satellite (TESS) observatory.

The researchers found that more frequent, lower energy flares had a greater impact on an exoplanet's atmosphere than less frequent, higher energy flares. The researchers also determined how different types of stars produce extreme ultraviolet radiation (XUV) through stellar flares, and how nearby planets are affected.

The ability to sustain an atmosphere is one of the most important requirements for a habitable planet. This research provides new insights into the habitability of exoplanets, as the effects of stellar activity were not well understood. This study also highlights the need for better numerical modeling of atmospheric escape—how planets release atmospheric gasses into space—as it can lead to the erosion of [atmosphere](#) and the diminishment of the planet's habitability.

"Given the close proximity of exoplanets to host stars, it is vital to understand how space weather events tied to those stars can affect the habitability of the [exoplanet](#)," said Atri. "The next research step would be to expand our data set to analyze stellar flares from a larger variety of [stars](#) to see the long-term effects of stellar activity, and to identify more potentially habitable exoplanets."

**More information:** *Monthly Notices of the Royal Astronomical Society: Letters* (2020). [DOI: 10.1093/mnrasl/slaa166](https://doi.org/10.1093/mnrasl/slaa166)

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