

# Exploring Exotic Atmospheric and Surface Environments of TRAPPIST 1 Exoplanetary System

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Recent discovery of seven dwarf planets in TRAPPIST-1 system presents a unique opportunity to study exotic exoplanetary environments around a magnetically active M dwarf star. The inner planets are exposed to the large fluxes of X-ray and Extreme UV radiation from the stellar corona and frequent flares. Here we present the results of our study of the atmospheric escape rates of TRAPPIST 1 b-h exoplanets with hydrogen rich, water rich and high mean molecular weight Earth-like atmospheres using a combination of 3D Global Magnetospheric Model, 1D Exo Global Ionosphere and Thermosphere (Exo-GIMT) and 1D PLANET Ionosphere Thermosphere Tool for Research (PLANET - ITTR). The inner exoplanets are also subject to large tidal heating that can significantly affect their surface temperatures. We also examine the impact of flares and associated stellar energetic particles on surface radiation dose of TRAPPIST exoplanets. Implications for habitability of inner and outer exoplanets will be discussed in our presentation.

Keywords: X-ray and Extreme UV emission, flares, atmospheric escape, magnetosphere, habitability, surface dosage