

ASTROPHYSICS SEMINAR SERIES

Blast from the Past: The Evolution of Ultraviolet Emission and Flaring from Low-Mass Stars and its Implications for Habitable Zone Planets

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Roughly seventy-five billion low-mass stars in our galaxy host at least one small planet in the habitable zone (HZ). The stellar ultraviolet (UV) radiation from such low-mass stars is strong and highly variable, and impacts planetary atmospheric loss, composition and habitability. These effects are amplified by the extreme proximity of their HZs. Knowing the UV environments of planets of all sizes will be crucial to understanding their atmospheric composition and evolution, providing the needed context for measured exoplanet spectra. For HZ terrestrial planets, characterization of the UV flux provides a key parameter of a planet's potential to be habitable and discriminating between biological and abiotic sources of observed biosignatures. I will present our efforts to measure, as well as predict, the UV evolution of such planetary systems using space telescopes of the past, present and future: the Galaxy Evolution Explorer (GALEX), the Hubble Space Telescope (HST), and the NASA-funded Star-Planet Activity Research CubeSat (SPARCS), ready for launch at the end of 2021. SPARCS will be a 6U CubeSat devoted to continuous monitoring of low-mass stars, measuring their variability, flare rates and evolution, while also being as a pathfinder for much-needed future UV satellites.

02 APR 2019 · 3:30 PM
RUTHERFORD BELL ROOM (103)

