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Updates on YZ Ceti: Using Star-planet Interactions to Determine Planet Magnetic Fields

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Exoplanetary magnetic fields play an important role in modulating atmospheric mass-loss and potentially shielding the atmosphere from the impact of energetic particles in the stellar wind. The planetary fields may thus be an important ingredient in assessing the prospects for habitability; however, there remains few empirical constraints on exoplanetary magnetic properties. The recent detections of radio emission from the nearby exoplanet host, YZ Ceti, suggest that the star is possibly interacting with its rocky innermost planet. These radio emissions are characterized by strong circular polarization, and appear to repeat within consistent orbital phase windows dictated by the orbital position of YZ Ceti b. The strength of the radio bursts are further consistent with theoretical predictions of the star-planet interaction. We will discuss our ongoing efforts to characterize this system and test potential alternative interpretations of the radio emissions. Our efforts in fully characterizing the magnetic properties of the star with spectropolarimetry will let us transform the radio detections into bona fide constraints on an exoplanet magnetic field. Exoplanetary science is an interdisciplinary field with multiwavelength contributions emerging from various areas of astronomy. The advent of radio star-planet interactions illustrates how radio observatories will make significant advances at this vanguard of understanding extrasolar magnetospheres and habitability.