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The radio star AU Microscopii: Hunting for signatures of star-planet interaction in the presence of stellar activity

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A key question in stellar astronomy is whether there are habitable planets around stars other than our Sun. An important factor in determining this is stellar activity, as stellar eruptions have direct impact on the atmosphere of an exoplanet. Radio emission, especially with a high degree of circular polarization, can provide a direct measurement of the magnetic field and the plasma properties of the star. Although many stars have been observed at radio frequencies, very few have been studied extensively enough to see the full phenomenology of radio emission. In this talk, I will present our year-long observing campaign of AU Microscopii, a young M-dwarf system with three detected planets. This system has been studied in detail at many wavelengths, but not at radio frequencies. With over 100 hours of observations, this campaign has allowed us to describe and categorize different types of stellar radio emission in a detail never before attainable for a single star. This includes characterizing rare types of emission such as those similar to solar radio bursts and Jovian magnetospheric emission. I will conclude with an interpretation of the physical processes causing these types of emission.

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