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Investigating the Hidden Origins of Fast Radio Bursts and Other Radio Transients

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The last decade of investigations into the extragalactic radio sky has led to a paradigm shift, with all-together new and uncharacterized populations of radio transients emerging for the first time. Upgrades in multiple fast radio burst (FRB) experiments have led to the first samples of precisely localized events, enabling host galaxy associations and detailed observations of the immediate environments surrounding FRBs. Such observations play a key role in elucidating the stellar populations that give rise to FRB progenitors. In this talk, I will review our current knowledge of FRB progenitors based on the properties of a small, but growing sample of host galaxies, and I will outline major follow-up efforts to build the first statistically meaningful sample of FRB hosts. I will highlight our recent discovery of an FRB in an unexpected environment, which challenges our previous understanding of these events. Finally, I will explore how the localization of several repeating FRBs in dwarf galaxies, their spatial coincidence with persistent radio sources, and the detection of long-lived radio transients in dwarf galaxies further implicate an entirely new population of radio sources on the sky. I will discuss our large-scale effort to uncover this unique population for the first time.

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