

Shedding light on the faintest galaxies with the world's biggest steerable dish

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Astronomers are one step closer to understanding a mysterious class of optically faint galaxies thanks to deep radio observations with the Green Bank Telescope, reveals a poster presented today at the Canadian Astronomical Society Annual Meeting in Victoria, British Columbia.

Surveys with optical telescopes have revealed that 'ultra diffuse [galaxies](#)'—enigmatic objects as big as the Milky Way but with only a small fraction of its stars—are abundant in and around galaxy groups and clusters. How ultra diffuse galaxies relate to Milky Way-type objects or to nearby dwarf galaxies is unknown, and progress in the optical is slow because of their extreme faintness. Instead, Professor Kristine Spekkens from the Royal Military College of Canada and her graduate student Ananthan Karunakaran from Queen's University are shedding light on this mysterious galaxy class through the eyes of the world's largest fully steerable radio [telescope](#).

Using deep observations with the Green Bank Telescope in West Virginia, Spekkens and Karunakaran discovered the atomic gas reservoirs—the stuff out of which stars ultimately form—associated with ultra diffuse galaxies around two compact galaxy groups. In contrast to the paucity of stars for their size, the gas content of ultra diffuse galaxies appears similar to that in other galaxies, while the gas motions suggest that they may be embedded in more extreme dark matter halos. These findings offer important clues to distinguish between competing theories for how ultra diffuse galaxies form, supporting a model in which their unusual properties stem at least in part from their dark

matter contents.

Spekkens and Karunakaran have teamed up with Dennis Zaritsky at the University of Arizona to follow up dozens of newly-detected ultra diffuse galaxies around the Coma cluster with the Green Bank Telescope; this larger sample will allow the researchers to systematically explore correlations between the gaseous and stellar contents of these enigmatic objects for the first time. Their ultimate goal is to understand how the diversity of galaxies that we see in the universe today formed and evolved.

More information: Kristine Spekkens et al. Atomic Gas in Blue Ultra Diffuse Galaxies around Hickson Compact Groups, *The Astrophysical Journal* (2018). [DOI: 10.3847/1538-4357/aa94be](https://doi.org/10.3847/1538-4357/aa94be) , arxiv.org/abs/1710.06557

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