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Searching for Ultra-Faint Milky Way Satellites with the DELVE Survey

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The cosmological standard model predicts that galaxies exist within a hierarchical paradigm, with large, luminous galaxies inhabiting massive dark matter halos and fainter dwarf galaxies inhabiting substructure in these halos. Long-term sky surveys including the Sloan Digital Sky Survey (SDSS) and Dark Energy Survey (DES) have resulted in the detection of many ultra-faint dwarf galaxies, offering important yet incomplete insight into the evolutionary history and structure of our own Milky Way galaxy. Here, I will introduce the DECam Local Volume Exploration (DELVE) Sky Survey, a 126-night multi-component survey on the 4-meter Blanco Telescope/ Dark Energy Camera at Cerro Tololo Inter-American Observatory (CTIO) in Chile. DELVE is intended to extend the region initially observed by DES in order to complete near-uniform observational coverage of the entire southern sky, allowing for analysis of the formation, distribution, and evolution of the Milky Way satellite population. The DELVE survey's deep, widefield observing strategy is uniquely suited to probing galactic dark matter by detecting overdensities of old, metal-poor stars in the Local Volume's stellar structure, which indicate the presence of a potential dwarf galaxy and thus dark matter substructure. I will highlight the recent discovery of the Centaurus I ultra-faint dwarf galaxy and the DELVE I halo star cluster, and describe ongoing efforts to search for new ultra-faint satellites of both the Milky Way and the Magellanic Clouds.

Summary

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