Breaking degeneracies in the formation of LSB dwarf galaxies with globular cluster systems

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Low-surface-brightness (LSB) dwarf galaxies are highly sensitive to the baryonic processes involved in galaxy formation and evolution, and several formation models have been proposed to explain their origin. Such models include episodic supernova feedback, and gravitational tidal interactions with their surrounding galaxies. However, the structural properties of these galaxies alone are often insufficient to distinguish between competing baryonic scenarios due to degeneracies among formation models.

In this talk, I show that globular cluster (GC) systems of LSB dwarf galaxies offer a powerful way to break these degeneracies. I demonstrate that by presenting our recent studies of dwarf galaxies in nearby galaxy clusters in the Local Universe, where we combined GC abundance and spatial distributions with galaxy structural parameters and stellar mass to study their formation pathways. I also outline a forward-looking strategy that combines state-of-the-art cosmological simulations with star cluster formation and evolution models to quantify the impact of baryonic processes on dwarf galaxies and their GC systems. This approach aims to establish GCs as robust probes of baryonic physics and to provide a framework for exploiting current and upcoming wide-field surveys (e.g., Euclid, Roman) to systematically test galaxy formation models.