

Baryons in the Merian 800 square degree survey

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Dwarf galaxies make up a considerably unconstrained region in fundamental galaxy relations and properties. Galaxies with stellar masses of $1 \times 10^8 - 1 \times 10^9 M_{\text{sun}}$ exhibit diverse star formation rates and rotation curves, which have thus far been at odds with theoretical models. For this reason, it is important to characterize the baryonic processes in dwarf galaxies.

We propose to spend 800 hours on ALPACA to observe 800 square degrees of the sky overlapping the Merian project footprint, which aims to characterize the dark matter, feedback, and black holes in star forming dwarf galaxies. The ongoing Merian survey will sample 100,000 dwarf galaxies ($M^* \sim 1 \times 10^8 - 1 \times 10^9 M_{\text{sun}}$) at $0.058 < z < 0.1$ with the Blanco telescope in Chile. Prior to ALPACA, the single pixel GBT L-band beam would have mapped this region to our mass limits in 12,000 hours. We will reach ~ 9 mK over the full 800 square degrees in 800 hours on ALPACA. This survey will complement and complete the characterization of the dark matter distribution and baryonic processes in these dwarf galaxies, and will be compared to hydrodynamical simulations to better understand the formation and evolution of dwarf galaxies.