

## Mapping Stellar Mass in the local universe —a crucial step towards understanding dark matter distribution in Nearby Galaxies

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Local galaxies are the endpoint of all cosmological evolution: to understand how galaxies evolve through cosmic time, we need a careful characterization of galaxy structures in the local universe. The Spitzer Survey of Stellar Structure in Galaxies (S4G) is one of the major legacy surveys of the post-cryogenic campaign of the Spitzer Space Telescope. With deep mid-infrared (3.6/4.5 $\mu$ m) imaging of > 2300 nearby galaxies with the IRAC camera probing stellar surface densities down to  $\ll 1 \text{ Msun/pc}^2$ , S4G is the largest, deepest and most homogenous mid-infrared survey of the nearby Universe to date and provides the ultimate inventory of the distribution of stellar mass and structure in local galaxies. Combined with deep optical follow-up, an unprecedented opportunity opens up to complement a stellar mass census with a detailed analysis of the stellar populations in stellar structures. With this in mind we have initiated the Census of Austral Nearby GALaxies (or CANGA survey), an observational campaign using the Goodman imager on the SOAR telescope to go after local galaxies in the southern sky. With a projected sample of >1000, CANGA will represent the deepest mapping ever of a complete sample in this hemisphere, providing a spatially-resolved analysis of stellar populations at the 10s-to-100 pc-scale of key stellar structures in nearby galaxies. CANGA complements the exquisite work that has been performed by the Sloan Digital Sky Server (SDSS) in the northern hemisphere, but largely surpasses its sensitivity. Combining the spatially-resolved analysis of stellar populations from CANGA with the stellar mass mapping from S4G, this program represents a meticulous probe of the baryonic component required for the decomposition of galaxy rotation curves. This, in turn, allows for the subsequent isolation of the dark matter (DM) component, with important inputs (DM profile for our galaxy, as well as an estimate of the local DM density) for direct detection experiments of DM. As one of the original members of the S4G collaboration and PI of CANGA, I intend to provide a brief review of discoveries we have made within this combined data set, placing them within the broad context of galaxy evolution over cosmic times.

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