

Star Formation History of the Magellanic Clouds: a survey program with DECam@4mCTIO.

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Abstract

Various recent discoveries have drastically altered our view of the Magellanic Clouds (MCs), the nearest interacting galaxy system formed by a low mass spiral and a dwarf irregular galaxy. The best evidence is now that they are on first infall into the Milky Way, that their stellar populations extend much further than previously thought, and that they display important galactocentric gradients. Several facts indicate that low mass spirals may not fit in the general framework of massive spiral galaxy formation. Thus, understanding the process of their formation and evolution is fundamental to understand the general process of galaxy formation. Because the MCs are so close, they are key to study the formation and evolution of galaxies because they offer us the opportunity to derive their evolutionary histories, including the characteristics of the first events of star formation. This is thanks to the fact that, for them, we can obtain photometry and spectroscopy of individual stars, and use the theory of stellar evolution to calculate ages that will allow us to obtain the star formation and chemical enrichment histories in great detail. We are involved in a large survey of the MCs, called SMASH (Survey Magellanic Stellar History). It is a NOAO communityDECam survey of the Clouds mapping 480 deg² (distributed over ~ 2400 deg² at $\sim 20\%$ filling factor) to 24th mag *griz* (and *u* ~ 23). SMASH will: (1) map the stellar periphery of the Clouds with old main sequence turnoff stars to a surface brightness limit of 35 mag arcsec⁻², (2) identify the stellar component of the Magellanic Stream and Leading Arm for the first time, if they exist, and (3) derive spatially-resolved star formation histories covering all ages out to large radius from the Cloud centers. Our group at the IAC is the main responsible for objective (3).