

Multispectral Narrow-band Imaging Campaign for Nearby Old Stellar Systems

Chang H. Ree¹, Hyunjin Jeong¹, Sang-Il Han¹, Young-Wook Lee², Michael Hilker³

¹*Korea Astronomy and Space Science Institute, Daejeon, Korea*

²*Yonsei University, Seoul, Korea*

³*European Southern Observatory, Garching, Germany*

We introduce an ongoing imaging survey with custom-designed narrow-band filters to study the stellar population structure of nearby galaxies by mimicking large-aperture 2D integral field spectroscopy. Our main focus is on the absorption-line systems, such as elliptical galaxies, dwarf ellipticals, and local group dwarf spheroidal galaxies, which have been yet unexplored with narrow-band filter imaging. Extragalactic compact objects, such as globular clusters and ultra-compact dwarf galaxies, are also important targets as the signs of multiple stellar populations could be detected in their integrated absorption-line strengths. The primary goal of this survey is to develop new photometric color indices to measure the galaxy-wide internal dispersions of stellar age and metallicity, by mapping nearby galaxies with large field-of-view narrow-band images at three major optical absorption lines (H β , Mgb, NaD), combined with the pseudo-continuum images with adjacent Strömgen medium-band filters. The survey designs, data reduction procedures, and data calibration strategies are described. We verify our first observation results against the spectroscopic data for extragalactic star clusters, and discuss the possible use of the new narrow-band photometric filter systems for a fast and cost-effective pathfinder survey to characterize the history of star formation and chemical enrichment of present-day old stellar systems.