

[KMT-05] Wide-field and Deep Survey of Nearby Southern Clusters of Galaxies

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Thanks to KMTNet's wide field of view, it is time to implement imaging survey of extensive area of clusters of galaxies in the southern sky with modern instrument. As part of potential long-term survey of nearby ($D < 50$ Mpc) well-known clusters of galaxies, we propose a wide-field and deep survey of Fornax cluster as a first step of the project. By imaging the 400 square deg region (100 fields) enclosed within the five times virial radius of the Fornax cluster, in three SDSS filters (g', r', i'), we can provide an unprecedented view of structure of Fornax cluster using sample from giant to dwarf galaxies. We will secure galaxies with brightness comparable to the limiting magnitude ($r' = 23.1$ AB mag) of SDSS. Furthermore, we also request extremely deep (limiting surface brightness of ~ 28 mag arcsec⁻² for r' band) survey for the central region (16 square degree, i.e., four fields) of Fornax cluster. This will allow us to detect the diffuse intracluster light (ICL) that permeates clusters as a valuable tool for studying the hierarchical nature of cluster assembly. In order to complete whole survey, about 285 hr observing time (without overhead) is required. By combining data available at other wavelengths, it will offer unique constraints on the formation of large-scale structure and also provide important clues for theories of galaxy formation and evolution. Our proposed survey will be implemented in the close collaboration with researchers in various countries (Germany, Australia, UK, USA) and ongoing project (e.g., SkyMapper).