[GC12] The Nuclear Regions of the Messier's Galaxies

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Recent studies imply that the formation and the properties of the whole galaxies are inseparable from the supermassive black holes at the center of the galaxies. Therefore, the systematic study of the central nuclear region would help to understand the whole galaxy in general. To study and classify the complex nuclear structures of nearby galaxies, we analyzed the nuclear regions of 20 Messier's galaxies photographed by HST/WFPC II: brightness profiles and color maps were examined and surface photometry was performed. We found possible ten multiple nucleus galaxies with separations between multiple peaks in the range of 2~ 40 pc. Multiple nucleus galaxies appear more often in core galaxies than in power-law galaxies. In all multiple nucleus galaxies, the isophote centers are displaced at each different flux levels and for different bandpass images within the most central region of ~1 arcsec. M51 and M77 among them have the characteristics similar to M31: the brightest peak in red band appears as the dimmer second peak in blue band. We also note that the lines connecting the double peaks are aligned with the major axes of the galaxies for M77 and M98.

[GC13] Star formation and figure rotation in the early-type galaxy NGC2974

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We present Galaxy Evolution Explorer (GALEX) far and near ultraviolet imaging of the nearby early-type galaxy NGC2974, along with complementary optical imaging. In the ultraviolet, the galaxy reveals a central spheroid-like component and a newly discovered complete outer ring of radius 6.2 kpc, with suggestions of another partial ring at an even larger radius. Blue FUV-NUV and UV-optical colors are observed in the center of the galaxy and from the outer ring outward, suggesting young stellar populations ($\lesssim$1Gyr) and recent star formation. This is supported by a simple stellar population model which assumes two bursts of star formation, allowing us to constrain the age, mass fraction of the young component pixel by pixel. Overall, the mass fraction of the young component appears to be just under 1 percent. The additional presence of a nuclear and an inner ring (radii 1.4 and 2.9 kpc, respectively), as traced by [OIII] emission, suggests ring formation through resonances. All three rings are consistent with a single pattern speed of 78±6 km s-1 kpc-1, typical of S0 galaxies and only marginally slower than expected for a fast bar if traced by a small observed surface brightness plateau. This thus suggests that star formation and morphological evolution in NGC2974 are primarily driven by a rotating asymmetry (probably a large-scale bar), despite the standard classification of NGC2974 as an E4 elliptical.