[구GC-07] Nuclear star formation in galaxies due to non-axisymmetric bulges

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A non-axisymmetric mass distribution in the galactic bulge (or bar) causes gas inflow from the disk to the nuclear region, inducing intense star formation in the nucleus. We investigate the relation between the ellipticity of the bulge and the presence of a nuclear starburst by using a volume-limited sample of galaxies. We use 1,680 spiral galaxies with Mr < −19.5 at 0.02 <= z < 0.05 in the Sloan Digital Sky Survey Data Release 7. We find that the occurrence of nuclear starburst has a moderate correlation with bulge ellipticity in intermediate-type spiral galaxies (morphology classes Sab~Sb) in low galaxy number density environments. In high galaxy number density environments, close encounters and mergers between galaxies can cause gas inflow to the nuclear region even without the presence of non-axisymmetric bulges.

[구GC-08] The Evolution of Barred Galaxies

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Radial light profiles of bars are known to be related to the morphology of their host galaxies in a way that bars in early type disk galaxies show flat radial light profile, while bars in late type disk galaxies show exponential profile. To quantify how flat or steep bar profiles are, we have performed detailed two-dimensional decompositions on 3.6 micron images for 144 barred galaxies from the Spitzer Survey of Stellar Structure in Galaxies (S4G), and then modeled bar profiles with Sersic functions. We find that bars in classical bulge, higher bulge-to-total (B/T) galaxies are flatter than bars in bulgeless, lower B/T galaxies. In particular, we find that the presence of a bulge almost always guarantees that the bar is flat. Conversely, bulgeless galaxies, mostly have bars with steep profiles. This implies that the light profile of bars may be a dynamical age indicator of bars. We also find that the shape of bars are boxy and do not change with B/T. This indicates that as galaxies evolve, bars change their light profile while keeping their outermost shape boxy.