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[포 GC-01] Numerical study on the evolution of the spin of spiral galaxies

Jeong-Sun Hwang[1], Changbom Park[2]
[1]Department of Physics and Astronomy, Sejong University, [2]School of Physics, Korea Institute for Advanced Study

We investigate the evolution of the galactic spin of spiral galaxies in various dynamical situations using the N-body/SPH simulations. To do this we first construct a Milky Way-like galaxy model. Then we perform both prograde and retrograde encounters between the spiral galaxy pair. We also conduct a simulation with our galaxy model in isolation for comparison. We find that the circular motion of the disk stars in the inner region of the galaxy decrease clearly when the galaxy experiences strong prograde interactions. Such decrease has not found when the galaxy experiences weak or no interactions. We compare our simulation results with recent observational studies on the galactic spins.

[포 GC-02] On the origin of escape fractions of ionizing radiation from star-forming galaxies at high redshift

Taehwa Yoo[1], Taysun Kimm[1], and Joakim Rosdahl[2]
[1]Department of Astronomy, Yonsei University, [2]Univ Lyon, Univ Lyon1, Ens de Lyon, CNRS, Centre de Recherche Astrophysique de Lyon

The physical origin of low escape fractions of ionizing radiation derived from Lyman-break galaxies (LBGs) at $z \sim 3-4$ is a puzzle in the theory of reionization. We perform idealized disk galaxy simulations to investigate how galactic properties, such as metallicity and gas mass, affect the escape of Lyman continuum (LyC) photons using radiation-hydrodynamic code RAMSES-RT, with strong stellar feedback. We find that the luminosity-weighted escape fraction from a metal-poor (Z=0.002) galaxy embedded in a halo of mass $M_h \sim 10^{11} M_\odot$ is $\langle f_{esc}^{3D} \rangle \sim 8\%$. However, when the gas metallicity is increased to Z=0.02, the escape fraction is significantly reduced to $\langle f_{esc}^{3D} \rangle \sim 1\%$, as young stars are enshrouded by their birth clouds for a longer period of time. On the other hand, increasing the gas mass by a factor of 5 leads to $\langle f_{esc}^{3D} \rangle \sim 4\%$, as LyC photons are only moderately absorbed by the thicker disk. Our experiments seem to suggest that high metallicity is primarily responsible for the low escape fractions observed from LBGs, supporting the scenario in which the escape fraction has a negative correlation with halo mass. Indeed, our simulated galaxy with the typical metallicity of LBGs (Z=0.006) shows the relative escape fraction of 8%, consistent with recent observations of galaxies with $M_{1500} = -20$.

[포 GC-03] Investigating the sensitivity of the clumpy torus model parameters to the IR data in QSOs

HyeongHan Kim[1,2], Mariela Martinez-Paredes[2], Bong Won Sohn[2]
[1]Yonsei University, [2]Korean Astronomy and Space science Institute

The AGN unification model suggested the presence of obscuring material, a dusty torus, to explain the various types of AGN. IR SED model fitting is a crucial tool to probe the structure and properties of the dusty torus. We use a sample of 16 local quasi-stellar objects in Martinez-Paredes et al. (2017) with obtained NIR and MIR high-angular resolution (~0.3'') imaging data from EMIR, CIRCE and CanariCam on the 10.4-m Gran Telescopio CANARIAS (GTC) while 4 objects have NIR high-angular resolution photometry from NICMOS/HST from the literature. The unresolved NIR emission from the NIR image analysis and low-resolution Spitzer/IRS spectra are used to construct NIR-MIR SEDs covering a larger spectral range. We investigate the sensitivity of the geometrical (e.g. viewing angle) and physical parameters (e.g. optical depth) of the clumpy dusty torus model of Nenkova et al. and the clumpy disk+outflow model of Hoenig et al. We aim to investigate the minimal dataset needed to well constrain the parameters of the models and derive the properties of the dusty torus. These results will allow us to plan future observations for a larger sample of high luminosity AGNs with the James Webb Space Telescope and the Giant Magellan Telescope.

[포 GC-04] Tracing Dark Matter Halo Mass Using Central Velocity Dispersion of Galaxies

Gangil Seo[1], Jubee Sohn[2], and Myung Gyoon Lee[1]
[1] Astronomy Program, Department of Physics and Astronomy, Seoul National University, Gwanak-gu, Seoul 151-742, Korea
[2] Smithsonian Astrophysical Observatory, Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138, USA