[포IM-15] Near-IR Polarimetry around 30 Doradus Ⅱ. Polarization Structure of the Expanded Survey Field

Jaeyeong Kim[1], Soojong Pak[1], Wonseok Kang[1]

[1]School of Space Research, Kyung Hee University,
[2]Korea Astronomy and Space Science Institute,

We present near-IR imaging polarimetry of the observed 5 x 9 fields (~39′ x 69′) in the Large Magellanic Cloud (LMC), using the InfraRed Survey Facility (IRSF). We obtained polarimetry data in J, H, and Ks bands using the JHKs-simultaneous imaging polarimeter SIRPOL. We measured Stokes parameters of point-like sources to derive the degree of polarization and the polarization position angle. We show a polarization vector map in the reduced 45 fields and the statistical distribution of the polarization degrees and angles. This poster presents the preliminary results to show the physical properties of the magnetic field in the observed LMC regions.

[포IM-16] Gravitational Instability of Rotating, Vertically-Stratified, Polytropic Disks

Kim, Jeong-Gyu[1], Kim, Woong-Tae[1,2], & Hong, Seung Soo[1,3]
[1]Department of Physics and Astronomy, Seoul National University, [2]Institute for Advanced Study, [3]National Youth Space Center

While many astrophysical disks are vertically stratified and obey a polytropic equation of state, most studies on gravitational instability (GI) of flattened systems consider isothermal, razor-thin disks by taking vertical averages of disk properties. We investigate local GI of rotating pressure-confined polytropic disks with resolved vertical stratification by performing linear stability analysis. We find that the GI of vertically-stratified disks is in general a combination of conventional razor-thin Jeans modes and incompressible modes. The incompressible modes that dominate in the limit of the maximal disk compression require surface distortion and are an unstable version of terrestrial water waves. Disks with a steeper equation of state are found to be more Jeans unstable because they tend to have a smaller vertical scale height as well as a steeper temperature gradient corresponding to lower pressure support. GI depends more sensitively on the vertical temperature than density distribution. The density-weighted, harmonic mean, rather than the simple mean, of the adiabatic sound speed well describes the dispersion relation of horizontal modes, and thus is appropriate in the expression for Toomre Q stability parameter of razor-thin disks. We generalize Q into vertically-stratified disks, and discuss astrophysical application of our work.