구 두 발 표 초 록

초 청 강 연

[초 IT-01] Episodic Accretion in Star and Planet Formation

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Protostars grow their mass by the accretion of disk material, which is infalling from the envelope. This accretion process is important to the physical and chemical conditions of the disk and envelope, and thus, the planets yet to be formed from the disk material. Therefore, if we map the physical and chemical properties of disks and envelopes, we can study indirectly the accretion process in star formation. In particular, the chemical distribution in the disk and the inner envelope of a young stellar object is greatly affected by the thermal history, which is mainly determined by the accretion process in the system. In my talk, I will review the episodic accretion model for the low mass star formation and observational efforts to find the evidence of episodic accretion. Finally, I will present our recent ALMA detection of several complex organic molecules associated directly with the planet formation in V883 Ori, which is in the burst accretion phase.

[초 IT-02] Horizon Run 5: the largest cosmological hydrodynamic simulation

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Horizon Run 5 is the most massive cosmological hydrodynamic simulation ever performed until now. Owing to the large spatial volume (717×80×80 $[cMpc/h]^3$) and the high resolution down to 1 kpc, we may study the cosmological effects on star and galaxy formations over a wide range of mass scales from the dwarf to the cluster. We have modified the public available Ramses code to harness the power of the OpenMP parallelism, which is necessary for running simulations in such a huge KISTI supercomputer called Nurion. We have reached z=2.3 from z=200 for a given simulation period of 50 days using 2500 computing nodes of Nurion. During the simulation run, we have saved snapshot data at 97 redshifts and two light cone space data, which will be used later for the study of various research fields in galaxy formation and cosmology. We will close this talk by listing possible research topics that will play a crucial role in helping us take lead in those areas.

외부은하 / 은하단

[구 GC-01] A new approach to classify barred galaxies based on the potential map

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Automatic, yet reliable methods to find and classify barred galaxies are going to be more important in the era of large galaxy surveys. Here, we introduce a new approach to classify barred galaxies by analyzing the butterfly pattern that Buta & Block (2001) reported as a bar signature on the potential map. We make it easy to find the pattern by moving the ratio map from a Cartesian coordinate to a polar coordinate. Our volume-limited sample consists of 1698 spiral galaxies brighter than Mr = -15.2 with $z < 0.01$ from the Sloan Digital Sky Survey/DR7 visually classified by Ann et al. (2015). We compared the results of the classification obtained by four different methods: visual inspection, ellipse fitting, Fourier analysis, and our new method. We obtain, for the same sample, different bar fractions of 63%, 48%, 36%, and 56% by visual inspection, ellipse fitting, Fourier analysis, and our new approach, respectively. Although automatic classifications detect visually determined, strongly barred galaxies with the concordance of 74% to 86%, automatically selected barred galaxies contain different amount of weak bars. We find a different dependence of bar fraction on the Hubble type for strong and weak bars: SBs are preponderant in