[초GC-07] Type Ia 초신성의 광도진화와 암흑에너지

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암흑에너지가 존재한다는 가장 강력한 증거는 Type Ia 초신성을 이용한 먼 은하의 거리측정으로부터 제시된다. 이러한 결론은 경험적인 방법에 의해 표준화 과정을 거친 Type Ia 초신성의 수정된 밝기가 look-back time에 따라 진화하지 않을 것이란 가정에 기초한다. 그러나 최근 이 가정이 합당하다는 증거가 점차 불확실해지면서 Type Ia 초신성의 광도 진화에 대한 검증이 다시 요구되고 있다. 우리는 여기서 Type Ia 초신성의 광도곡선 분석과 호스트 은하의 분광관측으로부터 Type Ia 초신성의 광도진화효과를 규명하기 위해 새롭게 시작한 프로젝트 YONSEI (YOnsei Nearby Supernovae Evolution Investigation) 를 소개하고 예비 결과를 논의할 예정이다.

[구GC-08] Luminosity function and size distribution of HII regions in M51

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We present a study of HII regions in M51 using HST/ACS images taken as part of the Hubble Heritage Program. We found about 19,600 HII regions in M51 with H_α luminosity in the range of L = $10^{35.5}$ – $10^{39.0}$ erg s^{-1}. The H_α luminosity function of HII regions (HII LF) in M51 is well represented by a double power law with its index α = -2.25 ± 0.02 for the bright part and α = -1.42 ± 0.01 for the faint part, separated at a break point L = $10^{37.1}$ erg s^{-1}. Comparison with simulated HII LFs suggests that this break is caused by the transition of HII region ionizing sources, from low-mass clusters (including several OB stars) to more massive clusters (including several tens of OB stars). The HII LFs with L < $10^{37.1}$ erg s^{-1} are found to have different slopes for different parts in M51: the HII LF for the interarm region is steeper than those for the arm and the nuclear regions. This observed difference in HII LFs can be explained by evolutionary effects: HII regions in the interarm region are relatively older than those in the other parts of M51. The size distribution of the HII regions is fitted by a double power law with a break at D = 30 pc. The power law index for the small HII regions with 15 pc < D < 30 pc is α = -1.78 ± 0.04, whereas α = -5.04 ± 0.08 for the large HII region with 30 pc < D < 110 pc. The power law indices of the size distribution are related with those of HII LF, and the relation between the luminosities and sizes of HII regions is fitted well by L $\propto$ $D^{3.04\pm}$