photoionization model calculations using 'CLOUDY' to explore He Ⅱ emission strengths dependent on the physical conditions of the central star. The emission nebula is treated as a simple spherical shell with uniform density. It is found that detectable Raman-scattered He Ⅱ are obtained for T* ~ 10^5 K in the presence of a thick neutral component. We present mock spectra exhibiting Raman He Ⅱ features based on the photoionization calculations and compare them with observed data. We discuss effective strategies for searching young PNe with Raman-scattered He Ⅱ emissivities.

[포 SA-02] The effects of the scattering opacity and the color temperature on numerically modelling of the first peak of type IIb supernovae

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A type IIb supernova (SN IIb) is the result of core-collapse of a massive star which lost most of its hydrogen-rich envelope during its evolution. The pre-SN progenitor properties, such as the total radius and the mass of the hydrogen-rich envelope, can widely vary due to the mass-loss history of the progenitors. Optical light curves of SNe IIb are dominated by energy released by the hydrogen recombination and the radioactive decay of 56Ni in the early and late epochs respectively. This may result in distinctive double peaked light curves like the one observed in SN 1993J. The first peak, caused by the hydrogen recombination, can be modelled with numerical simulations providing information on the pre-SN progenitor properties. We compare two radiation-hydrodynamics codes, STELLA and SNEC, that are frequently used in SNe modelling, and investigate the effect of opacity treatment on the temporal evolution of the color temperature of SNe and eventually on the optical light curves. We find that with a proper treatment of the scattering opacity, SNe IIb models exploded from the progenitor models evolved with latest stellar evolution model hardly match the observational data. We also discuss the smaller scale features found in the models during hydrogen recombination phase.

[포 SA-03] Rapid Spectral Variability Monitoring of the Symbiotic Stars During One Night : CH Cyg, AG Dra, EG And

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공생별의 밝기 변화와 분광선 변화에 대한 지속적인 관측과 분석은 공생별 구성원의 구조, 거성으로부터의 질량 이동, 백색왜성 근처에서의 부착원반 형성과 이들의 진화에 대한 중요한 정보를 제공한다. 본 연구에서는 보현산 천문대 1.8-m 망원경과 고분산 에셀분광기 BOES를 이용하여 타 연구자에 의해 하룻밤 새 분광선 변화가 있다고 보고된 공생별 CH Cyg를 중심으로 AG Dra와 EG And의 방출선들에 대한 하룻밤 새 변화 모니터링 관측을 수행하였고, 이 세 공생별의 짧은 시간 내 분광적 변화 양상과 특성을 파악하고자 한다.

[포 SA-04] Flux-Limited Radiative Diffusion Module Applicable to Protoplanetary Disks

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Previous numerical simulations on planet-disk interactions revealed a lot of interesting phenomena including the planetary migration and the formation of many sub-structures inside the disks. However, these simulations were limited to an isothermal or adiabatic equation of state which does not account for various heating and cooling processes in the disks. Recent studies showed that the behavior of the planet-disk interaction can be significantly influenced by the disk thermodynamics. We develop a radiative diffusion module based on the two-temperature flux-limited diffusion approximation accounting for viscous heating and the accretion feedback. In this presentation, we describe our radiative diffusion solver, present some test results, and discuss potential applications of the module to planet-disk interactions,

[포 SA-05] volution of massive stars in Case A binary systems and implications for supernova progenitors

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One of the distinctive characteristics of the evolution of binary systems would be mass transfer. Close binary systems experience so-called Case A mass transfer during the main-sequence. We have performed calculations of the evolution of massive Case A (with the initial period 1.5 ~ 4.5 days) binary systems with the initial mass of 10 ~ 20 solar masses and mass ratio 0.5 ~ 0.95 using the MESA code. We find that in some systems,

after the first mass transfer, the secondary stars evolve faster than the primary stars and undergo so-called 'reverse' mass transfer. Such phenomena tend to occur in relatively low-mass (initial mass < 16 solar masses) and close (initial period < 3 day) systems. Unless a system enters the common-envelope phase, the primary star would become a single helium star after the secondary star ends its life if the system were unbound by the neutron star kick. We find the various evolutionary implications of the remaining primary stars. In addition to the evolution into the compact single helium star progenitor, there is a possibility that the remaining primary star could evolve into a helium giant star, which could be a promising candidate for Type Ibn supernova progenitor, depending on the core mass. Further, we find that some primary stars satisfy the conditions for the formation of electron-capture supernova progenitor.