streamers, plumes, and coronal loops, and the electron temperature is also expected to increase rapidly with distance from the sun. We will discuss how to determine the temperature and wind speed of the corona in the case of corona with thermal structures and non-spherical symmetric electron density.

항성/항성계

[포 SA-01] Correlation between Photometric Parameters and Morphology of the Proplyds in the Orion Nebula Cluster

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오리온 성운은 지구와 매우 가까이에 있고, 무거운 별이 포함된 성단과 성운이 밀접하게 연관되어 있어, 오리온 성운 성단은 가장 많이 연구된 천체 중 하나이다. 1993년 HST를 이용한 오리온 성운 성단의 관측으로 나이가 어린 별을 둘러싼 물질의 실루엣을 처음으로 보았다. 이후 이러한 천체를 원시행성계원반(protoplanetary disk, Proplyd)이라 불렀으며, 그 형태와 구조, 물리적 과정에 대해 꾸준히 연구가 진행되고 있다. 이 연구에서는 지상 관측에서 얻은 UBVI 및 Hα 측광 자료와 원시행성계원반을 상호 동정하고, 원시행성계원반의 형태학적 특징과 측광인자의 관련성을 조사하였다. 또한 Spitzer 중적외선 자료와 Natta et al.(2004)의 근적외선 자료를 통합하여, 현재 사용되고 있는 자외선 초과와 근적외선 방출선을 이용한 질량 강착률 등의 해석에서 주의해야 할 천체들이 있다는 것을 발견했다.

[포 SA-02] On the origin of blue straggler stars in dwarf galaxies

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Blue stragglers (BSs) are the objects that are brighter and bluer than the stars at main-sequence turn-off point. In this study, we present the Ca-by and VI photometry for Galactic dwarf spheroidal galaxies using Subaru/Suprime-Cam and investigate the spatial distribution characteristics of BS stars using the hk index as a photometric metallicity indicator. We compare the cumulative radial distribution of the BS stars with those of two groups of red-giant-branch (RGB) stars divided by the hk-index strength, and find that the spatial distribution of all BS stars is closer to that of hk-weak (i.e. metal-poor) RGB stars. We also find that the hk-strong BS stars are more centrally concentrated than the hk-weak ones. We will discuss the use of hk-index as a metallicity indicator for the hot BS stars and suggest possible explanations for the results in terms of the origin of BS stars in the dwarf gal

[포 SA-03] The photometric studies of KIC 8804824 and KIC 10229723 with extremely low mass ratio: Discovery of small peculiar structures in the light residuals from the light-curve synthesis

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2개의 케플러 접촉쌍성인 KIC 8804824와 KIC 10229723의 초정밀 측광 자료를 가장 최신 버전의 윌슨-디비니 코드로 분석하여 정밀한 측광 해를 산출하고, 그 잔차들을 매우 자세하게 조사하였다. 두 개의 케플러 접촉쌍성은 제2식이 편평한 광도곡선을 가지고 있어, 이 두 쌍성은 W UMa형 A sub-group에 속한다. 또한, 광도곡선의 모양이 매우 대칭이며, 시간에 따른 변화가 크지 않다. 두 별의 측광 해를 살펴 본 결과, 두 별은 모두 주성의 온도가 부성의 온도보다 높고, 0.2보다 작은 극단적인 질량비와 90도에 거의 가까운 궤도경사각을 갖고 있다. 무엇보다도, 두 별의 측광 해의 잔차에서 공통적으로 전 위상에 걸쳐 모형화 되지 않은 특이한 구조를 발견하였다. 이 구조는 phase smearing 효과를 고려하더라도 그 구조의 모습만이 약간 달라질 뿐, 구조의 진폭에는 크게 영향을 미치지 않는 것을 발견하였다. 흥미롭게도 이 현상은 두 별의 주기가 각각 다름에도 불구하고 공통적으로 나타나며, 관측된 전 쿼터에 대해 나타난다. 이 현상의 가능한 원인에 대해 논의한다.

[포 SA-04] Broad Wings around Hα and Hβ in the S-type Symbiotic Stars

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Symbiotic stars are binary systems composed of a hot white dwarf and a mass losing giant. Many

symbiotic stars are known to exhibit broad wings around Balmer emission line. We show high resolution spectra of S-type symbiotic stars, Z Andromedae and AG Draconis, obtained with the ESPaDOnS and the 3.6 m Canada-France- Hawaii Telescope, in which we find prominent broad wings around Balmer lines. We adopt Monte-Carlo technique to consider two types of wing formation mechanisms, which are Thomson scattering by free electron in H II region and Raman scattering by atomic hydrogen in H I region. We find that Thomson wings of Hα and Hβ have the same widths in the Doppler space due to the cross section independent of wavelength. In contrast, Raman Hα wings are 3 times broader widths than Hβ counterparts, which is attributed to the different cross sections and branching ratios. Our CFHT data show that Hα wings of Z Andromedae and AG Draconis are broader than Hβ wings, lending strong support to the Raman scattering origin of Balmer wings in these objects.

[포 SA-05] Chemical Abundance Analysis of Ultra Metal-Poor ([Fe/H] < -4.0) Stars

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We present preliminary results of elemental abundances of six ultra-metal poor (UMP; [Fe/H] < -4.0) stars derived from high-resolution spectra obtained by Gemini/GRACES. The UMP candidates were selected for the high-resolution follow-up from the low-resolution spectra of Sloan Digital Sky Survey (SDSS). We investigate possible progenitors of the UMP objects by comparing the measured abundance patterns with yields that various supernova models predict. Our results can provide stringent constraints on the mass range of the first generation of stars, which are the progenitors of the UMP objects.

[포 SA-06] Magellan High Resolution Spectroscopy of Raman-Scattered He II, C II and O VI Lines in the Symbiotic Nova RR Telescopii

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RR~Telescopii is a symbiotic nova exhibiting accretion activities through gravitational capture of the slow stellar wind from a Mira variable. We present high resolution spectra of RR~Tel obtained with MIKE and the 6.5 m Magellan-Clay telescope, in which we find broad features with FWHM exceeding 10 Å at 6545, 6825, 7082, 7023 and 7053 Å. They are formed through Raman-scattering with atomic hydrogen of far-UV He II 1025, O~VI 1032, 1038 Å and C II 1036 and 1037 Å. We compute the Raman conversion efficiencies using the case B recombination theory for He II emissions, which are used in turn to infer the intrinsic line luminosities of O VI and C II. The Raman O~VI features are characterized by double-peaked profiles with a peak separation ~ 60km/s, pointing out the presence of an accretion disk with a physical size of ~ sub AU. In contrast, Raman C II features exhibit profiles with a simple peak and a narrower width ~40 km/s, indicating that C II is formed in a much more extended region. The weak C II multiplet at 1335, 1336 Å found in the IUE spectral archive and the absence of C II 1036, 1037 Å in the FUSE archive show that far-UV C II lines suffer heavy interstellar extinction consistent with the distance of ~ 2.5 kpc to RR Tel.

천문우주관측기술

[포 AT-01] Flight model development of the NISS structure for NEXTSat-1 payload

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