by the observations of Kepler mission in the long cadence mode having a time resolution of about 30 minutes. It means that the Kepler light curves of the system may be strongly affected by phase smearing effect and the analysis of them without consideration of the phase smearing effect may result in wrong stellar properties. Additionally, this system also shows dynamical variation of light curve resulting from spot activity. For all those reasons, it is difficult to investigate KIC6118779, and the investigation should be carried out carefully. In this presentation, we introduce the phase smearing effect and carry out the light curve modeling with the 2015 version of the Wilson-Devinney binary code considering the phase smearing effect. Our results show that the system is a deep over contact binary system and has extremely low mass ratio of about 0.12. Moreover our spot modeling implies the cyclic migration of a big cool spot on the massive component.

[구 SA-04] The Photometric Analysis Of The W Subtype Contact Binary EK Comae Berenices

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접촉쌍성 EK Com은 0.2667일의 짧은 주기를 가진 만기형 식쌍성으로 광도곡선의 변화로 인해 연구자마다 이 계의 하위 유형을 다르게 언급하여 하위유형의 혼동이 있는 천체이다. 우리는 소백산천문대에서 2009년 5월 VR 필터로, 2013년 2 ~ 5월 사이 BVRI 필터로, 2016년 1 ~ 4월 사이 R 필터로 CCD 측광 관측하여 3개의 새로운 광도곡선을 획득하였다.

우리의 관측 자료와 SuperWASP의 공개된 자료로부터 40개의 새로운 극심시각을 산출하였다. 이 극심시각을 포함하여 155개의 극심시각을 여러 문헌에서 수집하여 주기 연구를 수행한 결과, EK Com의 공전주기는 영년 주기 증가와 더불어 8.2년의 주기적인 변화가 겹쳐 변화함을 발견하였다. 이러한 주기 변화 원인에 대하여 살펴본 결과, 영년주기변화는 질량이 작은 별에서 큰 별로의 질량이동에 의하여 일어나고, 주기적인 변화는 질량이 큰 주성의 자기 활동에 의해 발생할 수 있음을 보였다. Wilson-Devinney code를 이용한 광도곡선 분석을 통하여 EK Com은 개기식이 부식에 있는 하위 유형 A라기 보다 주식에 있는 W형에 속하며, 모든 광도곡선에서 1개의 Hot spot과 1개의 Cool spot을 가진 모형이 가장 관측치를 잘 설명한다. W UMa형 별들의 HR도, 온도비, 질량의 그래프에서 EK Com은 W형 Group들이 있는 위치에 존재한다. 이는 광도곡선에서 유추한 EK Com의 하위 유형과도 일치한다.

[구 SA-05] The role of massive Population III binary systems in the formation of gravitational wave radiation source and in the cosmic reionization

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Abstract in either English or Korean

The Population III (Pop III) stars are thought to be massive. If massive Pop III stars form binary system and they experience mass transfer via the Roche lobe overflow, this may significantly change the properties of the system. For example, mass transfer in such system may shorten the period of the system, forming short period binary black hole (BBH) system, which is the most promising candidate for recently detected gravitational wave radiation sources. Also, there is an expectation that due to the stripped envelope of donor star by mass transfer, this system can play a significant role in the cosmic reionization by emitting more UV photons. However, this outcome highly depends on the initial properties of the system. We perform grid calculation on Pop III binary models with various initial primary masses (20 ~ 100 solar mass), initial separations, and initial mass ratios (q = 0.5 ~ 0.9). We find that 1) in most cases binary models show no increase in the number of ionizing photons and 2) formation of short period BBH system via mass transfer is highly unlikely.

[구 SA-06] Feature engineering with Wavelet transform for Transient detection in KMTNet Supernova Project

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For the detection of transient sources in optical wide field surveys like KMTNet Supernova Project, difference imaging technique is commonly used. As this method produces a fair amount of false positives, it is also common to utilize machine learning algorithms to screen likely true positives. While deep learning methods such as a convolutional neural network has been successfully applied recently, its application can be limited if the size of the training sample is small. I will discuss a variation of more conventional method that adopts the wavelet transform for feature engineering and its performance.