■ Session : 천문우주 I
10월 29일(목) 15:15 - 16:15 제1발표장

[(초)I-1-1] A period study of the double eclipsing - spectroscopic binaries V994 Her: Detection of double apsidal motions and a light effect

Chun-Hwey Kim[1], Chung-Uk Lee[2], Jang-Ho Park[2], Mi-Hwa Song[1]

[1]Dept. of Astronomy & Space Science, Chungbuk National University and Chungbuk National University Observatory, [2]Korea Astronomy and Space Science Institute

V994 Her(ADS 11373 AB, HIP 90483) has been recently known as a quadruple system which consists of double eclipsing and double double-lined spectroscopic binaries (Lee et al. 2008). BV CCD photometric observations of the intricate star system were made during the observing seasons from 2007 to 2008 with the 35cm reflector of the Campus station of the Chungbuk National University Observatory. From the observations a total of 10 times of minimum lights were newly determined. All timings collected, including ours, were intensively analyzed to yield new interesting findings: 1) two eclipsing binaries with the orbital periods of 2.d08326 and 1.d42001 in V994 Her system show possibly apsidal motions with different apsidal periods of 46.y4 and 15.y3, and eccentricities of 0.058 and 0.082, respectively. 2) a light-time effect with a period of 0.y93 may be possible, implying that a third-body be revolving around the binary with the orbital period of 2.d08326.

[I-1-2] The Solar-Type Contact Binary BX Pegasi Revisited

Jae Woo Lee, Seung-Lee Kim, Chung-Uk Lee, and Jae-Hyuck Youn

Korea Astronomy and Space Science Institute, Korea

We present the results of new CCD photometry for the contact binary BX Peg, made during three successive months beginning on September 2008. As do historical light curves, our observations display an O'Connell effect and the November data by themselves indicate clear evidence for very short-time brightness disturbance. For these variations, model spots are applied separately to the two data set of Group I (Sep.--Oct.) and Group II (Nov.). The former is described by a single cool spot on the secondary photosphere and the latter by a two-spot model with a cool spot on the cool star and a hot one on either star. These are generalized manifestations of the magnetic activity of the binary system. Twenty light-curve timings calculated from Wilson-Devinney code were used for a period study, together with all other minimum epochs. The complex period changes of BX Peg can be sorted into a secular period decrease caused dominantly by angular momentum loss due to magnetic stellar wind braking, a light-travel-time (LTT) effect due to the gravitational effect of a low-mass third companion, and a previously unknown short-term oscillation. This last period modulation could be produced either by a second LTT orbit with a period of about 16 yr due to the existence of a fourth body or by the effect of magnetic activity with a cycle length of about 12 yr.

[I-1-3] 영상차감법을 이용한 산개성단 M11의 변광성 검출

이충욱, 구재림, 김승리, 김동진

한국천문연구원 광학적외선천문연구부

한국천문연구원에서 개발 중인 외계행성 탐색 시스템은 우리은하 중심부 4°×4° 영역을 10분 간격으로 시계열 관측하여 지구형 외계행성을 검출하는 시스템으로써, 대용량의 관측자료를 처리하기 위하여 영상차감법을 사용한다. 이 방법은 최적화 방법을 이용하여 기준영상과 관측영상사이의 점퍼짐함수 변화를 나타내는 커널을 구하고, 이를 적용하여 만든 합성영상과 관측영상을 서로 차감한 잔차영상에서 밝아지거나 어두워진 변광성을 찾아내어 이들에 대한 구경측광 또는 점퍼짐함수 측광과정을 수행한다. 따라서 성단 및 은하중심부와 같이 별들이 밀집된 관측영역에 영상차감법을 이용하면 배경별들은 모두 제거되고 변광성만 남게 되므로 잔차영상의 분석을 통하여 변광성 검출 효율을 높일 수 있게 된다. 우리는 이 연구에서 구재림 등 (2007)에 의하여 수행된 산개성단 M11의 시계열관측 영상에 이 방법을 적용하여 얻은 새로운 결과와 기존 연구결과를 서로 비교하고, 변광성의 검출 효율과 측광 정밀도에 대하여 논의한다.

[I-1-4] Radiative Transfer Schemes for Hydrodynamical Stellar Surfaces

K. Bach[1], F.J. Robinson[2], & Y.-C. Kim[1]

[1]Yonsei University, [2]Yale University

We have investigated the radiational fields through a hydrodynamical stellar model atmosphere. Stellar convection zone is the extremely turbulent region composed of partly ionized compressible gases in high temperature. Moreover, super-adiabatic layers are the transition region in energy transport from convection to radiation. Therefore, opacities and thermodynamic properties due to interaction of matter and radiational fields vary significantly with depth. In order to describe radiational fields accurately, the Opacity Distribution Function (ODF) and the Accelerated Lambda Iteration (ALI) have been applied to hydrodynamic medium. As the first result of our radiative transfer, we present time-dependant variation of radiational fields and thermodynamic structures. Our non-gray transfer model has