On the Polarization of Raman Scattered O VI Lines in Symbiotic Stars

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We calculate the phase function and the polarization of the broad emission features around λ6830 and λ7088 observed in symbiotic star systems, which are believed to be Raman scattered O VI λ1032, 1038 doublets by atomic hydrogen. Due to the nearness of the O VI photons to the Lyβ, the resonance effect is strong and the polarization behavior is similar to that of the resonance scattering case between J = 1/2 state and J = 3/2, 1/2 degenerate states. The density matrix associated with the Raman scattered photon is calculated using the time-dependent perturbation theory.

The maximum degree of polarization for the right angle scattering is shown to be p_{max} = 0.2838 for λ1032 photon and a value of p_{max} = 0.2932 is obtained for λ1038 photon. The phase function $R(\mu) \propto 1 + p_{max}\mu 2$ are more isotropic than the Rayleigh phase function. Observational consequences are briefly discussed.

Effects of the Post-RGB stars on Hβ index of star clusters

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We present the variations of Hβ index strengths of star clusters due to the Post-RGB stars. Most of the Previous works have been done without careful considerations of the Post-RGB stars. Since the Balmer line strengths are very susceptible to the temperature - strongest at around 10,000K -, using the correct post-RGB stars, especially Horizontal-Branch(HB) stars are quite important. We estimate the equivalent width(EW) of H β absorption lines of star clusters at random ages and metallicities. We find that the strength of Hβ lines increase as clusters' mrtallicities decrease for colors become blue. However, it doesn't just increase but it shows a peak at certain metallicities due to the variations of HB morphologies of clusters as they age.

산개성단 NGC 6531의 CCD UBV측광

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산개성단의 광도함수와 질량함수에 관한 연구의 일환으로 호주 국립대의 사이딩스프링 천문대 1M 망원경으로 NGC 6531의 CCD(UBV) 측광을 수행하여 색-등급도를 얻었다.

분광형이 알려진 별들중 A0보다 조기형 별들의 관측 자료로부터 성간 소광에 무관한 Q인자를 구하고 이 인자를 이용하여 성간 적색화량을 결정하였다. 이 성단의 성간적색화량은 0.29(±

0.02SD), 거리지수는 10.6등급(±0.3)으로 측정되었다.

성단의 나이는 대략 8×10^6(±2×10^6)년으로 추정되며 나이분산은 천만년 이내로 추정된다. 이러한 분산은 Herbst & Miller(1982)가 비슷한 나이의 산개성단 NGC 3293의 관측에서 추정한 2천만년정도의 나이분산보다 작은 값이다.

Evolution of a Tidally Disrupted Star by a Massive Black Hole : Development of a Hybrid Scheme of the SPH and TVD Methods

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The evolution of the stellar debris after the disruption by super massive black hole's tidal force is a difficult problem to solve numerically. We developed a hybrid scheme of SPH(Smoothed Particle Hydrodynamics) and TVD(Total Variation Diminishing) in which the SPH particle is used to cover a widely spread debris and the TVD is used to provide a higher resolution calculation near the stream crossing where strong shock occurs. The debris atarts as SPH particles and is mapped onto the TVD grid when entering the TVD box. The outgoing flux at the TVD box boundary is represented by creation of particles at the boundary of the TVD box in such a way that mass, momentum and energy are conserved. Although the mass of newly created particles at the TVD boundary are generally much smaller than the incoming SPH particle mass, it is necessary to create particles at every TVD boundary grid in order for satisfactory energy conservation because of strong gravitational force by the black hole. Time step control between the SPH and TVD schemes and some preliminary results for the evolution of stellar debris using our scheme are presented.

DYNAMICAL IMPLICATION OF THE MOLECULAR CLOUDS IN THE GALACTIC CENTER REGION

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We have studied the response of gaseous disk to a rotating bar by conducting SPH simulations for the Galaxy in order to understand the distribution and kinematics of the Galactic Center molecular clouds. Our models for the Galaxy consist of three axisymmetric components (massive halo represented by the logarithmic potential, exponential disk, a compact bulge represented by a Plummer model) and a non-axisymmetric bar. The models with four different values for bar's axial ratio, 2:1, 2.5:1, 3:1, and 4:1 were considered. An axisymmetric model without the bar was also calculated for comparison. Our simulations clearly show that the orbits of particles are much perturbed by the rotating bar potential, giving rise to some