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We present multi-color, high-cadence photometric study of a distant SU UMa-type dwarf nova KSP-OT-201611a discovered by the Korea Microlensing Telescope Network (KMTNet) Supernova Program (KSP). From October 2016 to May 2017, two outbursts with an interval of approximately 90 days were detected in the BV I-bands. The shapes and amplitudes of the outbursts reveal the nature of KSP-OT-201611a to be a SU UMa-type dwarf nova of outside-in origin with a superhump and an inferred orbital period of 1.69 h. The two observed bursts show a distinctively different color evolutions during the bursts due most likely to the viscosity different in accretion disk between them. The observed quiescent magnitudes and properties of the source during the outbursts indicate that it is at a large distance (~7.3 kpc) and height (~1.7 kpc) from the Galactic disk, possibly belonging to the group of poorly-studied Population II dwarf novae. The continuous monitoring of this source may offer a rare opportunity to study a PopII dwarf nova.

[포 SA-03] Dynamic structure of the Sim open clusters (심 산개성단의 역동적 구조)

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722 open clusters in the Sim open cluster catalogue show the outermost structure of open clusters. The catalogue is based on the proper motion and parallax of the stars. These results reveal the hidden structures of weak membership signals in the field star contamination. It contains the tidal tails, flattened structure along the galactic plane, interacting double clusters and very poor and spread clusters. We will show these interesting structures.

[포 SA-04] KIC 6206751: the first R CMa-type eclipsing binary with γ Doradus pulsations

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We present the absolute properties of the double-lined eclipsing binary KIC 6206751 exhibiting multiperiodic pulsations. The *Kepler* light curve of this system was simultaneously solved with the previously published radial-velocity data. The results indicate that the binary star is a short-period semi-detached system with fundamental parameters of M_1=1.66±0.04 $M_\odot$, M_2=0.215±0.006 $M_\odot$, R_1=1.53±0.02 $R_\odot$, R_2=1.33±0.02 $R_\odot$, L_1=5.0±0.6 $L_\odot$, and L_2=0.96±0.09 $L_\odot$. We applied multiple frequency analyses to the eclipse-subtracted light residuals and detected the 42 frequencies below 2.5 days^{-1}. Among these, three independent frequencies of f_2, f_3, and f_4 can be identified as high-order ($38 \leq n \leq 40$) low-degree ($l=2$) gravity-mode oscillations, whereas the other frequencies may be orbital harmonics and combination terms. The ratios between the orbital frequency and the pulsation frequencies are f_{orb}:$f_{2\text{-}4}$ ≃2:3, which implies that the γ Dor pulsations of the detached primary star may be excited by the tidal interaction of the secondary companion. The short orbital period, and the low mass ratio and M_2 demonstrate that KIC 6206751 is an R CMa-type star, which is most likely evolving into an EL CVn star. Of seven well-studied R CMa-type stars, our program target is the only eclipsing binary with a γ Dor pulsating component.

[포 SA-05] 3D Radiation-Hydrodynimics for surface turbulence of Low-mass Stars

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We investigate 3D radiation-hydrodynamics (RHD) for surface convection of the solar-type low-mass stars (M = 0.8, 0.9, and 1.0 Msun). The outer convection zone (CZ) of low-mass stars is an extremely turbulent region composed of partly ionized compressible gases at high temperature. Particularly, the super-adiabatic layer (SAL), the top of the CZ is the transition region where the transport of energy changes drastically from convection to radiation. In order to accurately describe physical processes, a realistic treatment of radiation should be considered as well as convection. As a starting model, the initial stratification in the outer envelope calculated using the solar calibrations in the context of the standard stellar theory. When the numerical fluid becomes thermally relaxed, the thermodynamic structure of the steady-state turbulent flow was explicitly collected. In this presentation, we compared thermodynamic properties of turbulent convection of the solar-type low-mass stars.