

[KST-03] Detection of planetary signals in extremely weak central perturbation microlensing events via next-generation ground-based surveys

Sun-Ju Chung and Chung-Uk Lee

Korea Astronomy and Space Science Institute (KASI)

Even though current microlensing follow-up observations focus on high-magnification events due to the high efficiency of planet detection, it is very difficult to do a confident detection of planets in high-magnification events with extremely weak central perturbations (i.e., the fractional deviation is $\delta \lesssim 0.02$). For the confident detection of planets in the extremely weak central perturbation events, it is needed both the high cadence monitoring and the high photometric accuracy. A next-generation ground-based observation project, KMTNet (Korea Microlensing Telescope Network), satisfies both the conditions. Here we investigate how well planets in high-magnification events with extremely weak central perturbations are detected by KMTNet. First, we determine the probability of occurrence of events with $\delta \leq 0.02$. From this, we find that for $\leq 100 M_E$ planets in the separation of $0.2 \text{ AU} \lesssim d \lesssim 20 \text{ AU}$, events with $\delta \leq 0.02$ occur with a frequency of more than 70%, in which d is the projected planet-star separation. Second, we estimate the efficiency of detecting planetary signals in the events with $\delta \leq 0.02$ via KMTNet. We find that for main-sequence and subgiant source stars, $\geq 1 M_E$ planets can be detected more than 50% in a certain range that has the efficiency of $\geq 10\%$ and changes with the planet mass.

[KST-04] The Young Open Cluster NGC 1893 in the Outer Galaxy

Beomdu Lim and Hwankyung Sung

Department of Astronomy and Space Science, Sejong University, Seoul, Korea

We present a *UBVI* and $H\alpha$ photometric study of the young open cluster NGC 1893 in the outer Galaxy as part of "Sejong Open cluster Survey (SOS)" project. Using the properties of early-type stars in the photometric diagrams 65 early-type members were selected. More than 120 $H\alpha$ emission stars and candidates were found by $H\alpha$ photometry. Together with the published young stellar object catalogue and X-ray source list for this cluster, a total of 837 pre-main sequence (PMS) stars were identified in our photometric data. We obtained the mean reddening of $\langle E(B-V) \rangle = 0.56 \pm 0.08$ mag from the $(U-B, B-V)$ diagram and confirmed the normal reddening law ($R_V = 3.1$) toward NGC 1893 based on color excess ratios from optical to mid-infrared wavelengths. The zero-age main sequence fitting to the reddening-corrected color-magnitude diagrams gives a distance modulus of $V_0 - M_V = 12.8 \pm 0.1$. The age of the cluster inferred from stellar evolution models is about 1-2 Myr. We also found the Salpeter/Kroupa type initial mass function for this cluster. Finally, the mass accretion rate of 80 PMS stars with UV excess emission was estimated for the stars with masses from $0.6 M_\odot$ to $5 M_\odot$.