
[7ST-03] Flares and Starspots : Direct Evidences for Stellar Activities in Low-mass Stars

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The optical lightcurves of flare events can be regarded as a direct indicator about the existence of magnetic activity in low-mass stars. Stellar flares are generated by magnetodynamic processes in the stellar interiors as on the Sun and indicate that the locally intensified active regions still exist on the photosphere. However previous photometric observations are limited to a few selected active objects because of their faintness and randomness of the flare occurrence. Based on dedicated deep ($r \sim 23$), long-term (24 night) time-series monitoring of the open cluster M37 from MMT 6.5m transit survey program, we searched for flare-like transient phenomena in the 3,052 M-dwarf lightcurves with relatively high-temporal resolution (30s-90s). In order to collect all statistical significant events, we applied the change-point analysis with filtering algorithm using local statistics. We found a number of flares from 412 M-dwarf stars that are probable cluster members. Nearly half of them have periodic brightness variations with a near or distorted sinusoidal shape. With a small exception of binary cases, most of these variations appear to reflect the presence of large starspots resulting in rotational brightness modulations. We will discuss the relationship among magnetic activity indicators and dependence on spectral type.

[7ST-04] Evolutionary status of four detached binary stars

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We have presented the evolutionary status of four detached double line spectroscopic eclipsing binaries which are CD Tau, CM Lac, HS Hya and ZZ Boo because the component stars of these binary systems still act as a single star. We determined the absolute dimensions of these binary systems using photometric and spectroscopic solutions from analysis of light curves and radial velocity curves. Using the luminosities, effective temperatures and masses we choose evolutionary tracks of these binary systems. Finally we obtained ages and metallicity of the stars. We found that CM Lac and HS Hya are very young stars and their ages are in range of 0.15-1.05 and 0.22-1.14 Gyrs. For CD Tau and ZZ Boo, they are older than the others and their age in range of 1.95-2.95 and 1.48-1.73 Gyrs