

Contributed Talk

Splinter Activity

EVIDENCE FOR PHOTOMETRIC ACTIVITY CYCLES IN 3203 KEPLER  
STARS

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In recent years it has been claimed that the length of stellar activity cycles is determined by the stellar rotation rate. It is observed that the cycle period increases with rotation period along two distinct sequences, the so-called Active and Inactive sequences. In this picture the Sun occupies a solitary position in between the two sequences. Whether the Sun might undergo a transitional evolutionary stage is currently under debate. We present measurements of cyclic variations of the stellar light curve amplitude and the rotation period using four years of Kepler data. Periodic changes of the light curve amplitude or the stellar rotation period are associated with an underlying activity cycle. Using the McQuillan et al. 2014 sample we compute the rotation period and the variability amplitude for each individual Kepler quarter and search for periodic variations of both time series. To test for periodicity in each time series we consider Lomb-Scargle periodograms and use a selection based on a False Alarm Probability. We detect amplitude periodicities in 3203 stars with cycle periods between 0.5 and 6 years, covering rotation periods between 1 and 40 days. Our measurements reveal that the cycle period shows a weak dependence on rotation rate, slightly increasing for longer rotation periods. We further show that the shape of the variability deviates from a pure sine curve, consistent with observations of the solar cycle. Our measurements do not support the existence of distinct sequences in the rotation period - cycle period plane, although there is some evidence for the inactive sequence for rotation periods between 5 and 25 days. Unfortunately, the total observing time is too short to draw sound conclusions on activity cycles with similar length as the solar cycle.