The K2 Young Suns Survey: Clues to Star and Planet Formation from Observations of Young Open Cluster Stars

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We propose to obtain light curves for more than 1000 low mass members of the Pleiades, Hyades and Praesepe open clusters in Campaigns 4 and 5 of the K2 mission. We will use these data to: (a) determine the frequency of close-in gas giant planets in these clusters (and hence determine if being born in a dense environment affects the planet formation process); (b) identify eclipsing binary stars among these cluster members,thereby providing new precision tests of stellar evolution models; and (c) determine properties of these stars related to their youth (spottedness, rotation period, flaring frequency) better than can be done from ground based observations. By combining these data with similar data we have obtained with CoRoT for the 2 Myr old NGC 2264 open cluster, we will address how these properties evolve with time. The results from this program would add significantly to our knowledge of the origin and evolution of stars and planets, thereby directly addressing one of the primary NASA astrophysics goals.