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PHOTOMETRIC SEARCH FOR ACCRETION DISKS IN YOUNG CLUSTERS: NGC 2414

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In order to search for the presence of an accretion disk around young stars, we have obtained optical ($UBVRI$) photometry and retrieved infrared (JHK) photometry from the public Two Micron All-Sky Survey (2MASS) database for the young cluster NGC 2414. With this information we have obtained color-color and color-magnitude diagrams searching for stars showing an infrared excess. Based on the $(H-K)$ vs $(J-H)$ diagram, we have identified 20 stars showing an infrared excess which are good candidates to possess an accretion disk.

Observational data indicate that young stars, with ages of about 1 million years, show an infrared excess arising from an optically thick disk (e.g. Strom et al. 1993; Briceño et al. 2001). However, the number of infrared excess detections decreases with stellar age and actually this emission seems to completely disappear in objects older than 30 million years (Strom et al. 1993; Muzerolle et al. 2000). In order to follow up the evolution of accretion disks around young stars with ages between 1 and 10 million years it is necessary to increase the number of objects with an infrared excess lying in that specific range of ages. We present optical and infrared photometry for NGC 2414, which has an estimated age of 9.5 million years. While $UBVRI$ photometry was obtained with the 1.5 m telescope at the Observatorio Astronómico Nacional at San Pedro Mártir (OAN-SPM), JHK photometry was retrieved from the Two Micron All-Sky Survey (2MASS) public database. All photometric data were dereddened using Schlegel et al. (1998) values. We have obtained color-magnitude and color-color diagrams using the dereddened optical and infrared magnitudes. Based on the $(H-K)$ vs $(J-H)$ diagram, we have identified 20 stars showing an infrared excess (see Figure 1), making them good candidates to possess an accretion disk. Besides, we have also obtained the Spectral Energy Distribution (SED) for each candidate star to confirm the presence of an excess of infrared emission. Thus, given the estimated age of the cluster, these stars could be on their final stage of disk dissipation.

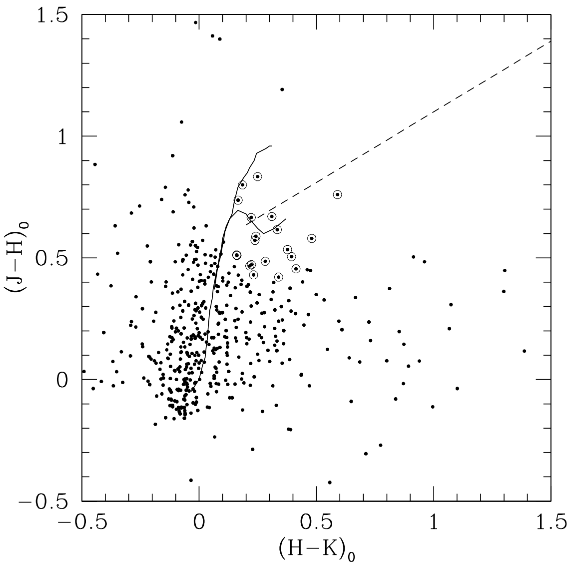

Fig. 1. Color-color diagram from the 2MASS photometry. Circled points indicate stars showing an infrared excess that were selected as candidate objects to possess an accretion disk. The standard sequences for dwarfs and giants (Bessell & Brett 1988) are shown as solid lines while the CTTS locus (Meyer et al. 1997) is shown as a dashed line.

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