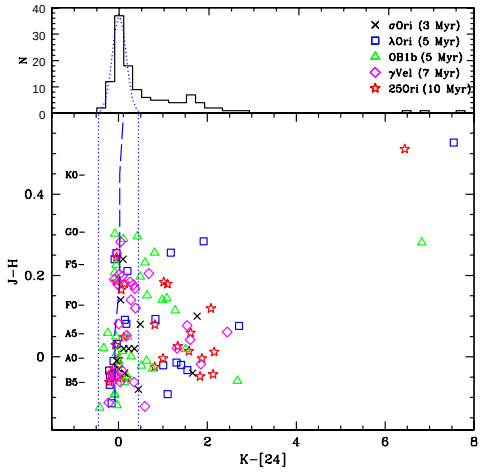

Fig. 1. Color magnitude diagram K-[24] versus $J-H$ illustrating the detection of disks at 24μm. The upper panel shows the distribution of the K-[24] color. Most of the intermediate mass stars are locate at K-[24]$\sim$0.11 exhibiting a Gaussian distribution (dotted line) with σ of 0.18 mag. The 3σ boundaries (dotted lines in the lower panel) represent the photospheric colors.

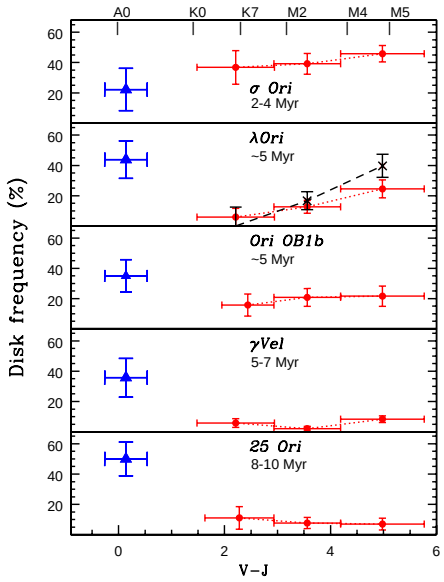

Fig. 2. Disk frequency versus spectral types. We displayed the location of the spectral type sequence, using the standard $V-J$ colors from Kenyon & Hartmann (1995). X's are the disk frequencies from Barrado y Navascués et al. (2007).

lar groups mainly located in Orion, the σ Ori cluster ($\sim$3 Myr, Hernández et al. 2007), the λ Ori cluster ($\sim$5 Myr, Hernández et al. 2009), the Orion OB1b sub-association ($\sim$5 Myr, Hernández et al. 2006) and the 25 Ori aggregate ($\sim$10 Myr, Hernández et al. 2006). We also included the γ Vel stellar cluster (Hernández et al. 2008), which has an stellar age of 6–7 Myr. These stellar groups cover an age range in which primordial disks are expected to evolve to second generation disks and planetary systems.

2. DISK DETECTION

Figure 1 shows a K-[24] versus $J-H$ color color diagram for intermediate mass stars. The three stars with K-[24] $>$ 6 are known HAeBe stars in which primordial disks are present. A group of stars (debris disk candidates) do not exhibit emission lines in their optical spectra and exhibit modest excess at 24μm (with K-[24] $<$ 3) comparable to debris disks in older stellar regions. The starless region (3 $<$ K-[24] $<$ 6) suggests that the phase for primordial disk dissipation around intermediate mass stars is very brief.

3. DISK FREQUENCY EVOLUTION VERSUS SPECTRAL TYPES

Figure 2 shows the disk frequency versus spectral types for several star-forming regions (Hernández et al. 2009). Because of observational thresholds (which are almost the same for all stellar groups), the observed disk frequencies in K and M stars reflect the primordial disk populations, while the observed disk frequencies in intermediate mass stars encompass both primordial and debris disks. In stellar population of 3 Myr, disk frequencies for A-type stars are lower than disk frequencies around low mass stars in agreement with the expected trend for primordial disk dissipation. In contrast, at 5 Myr and older, disks around A-type stars are more frequent than in low mass stars indicating than second generation dusty disk must dominated the disk population at higher stellar masses. The reversal in the disk frequency at 5 Myr or older suggests that at 5–10 Myr collisions start to produce large amount of dust during the transition from runaway to oligarchic growth (sizes of $\sim$500 km, Kenyon & Bromley 2008).

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