

**Stony Brook University
The Graduate School**

Doctoral Defense Announcement

Abstract

New Low-Mass Members of Nearby Young Moving Groups

By

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Young, co-evolving stars free of the obscuring effects of their formation region exist near the Sun in loose associations with each constituent having a common motion through the Galaxy. These associations are collectively known as the nearby young moving groups (NYMGs). Most known members of NYMGs are spectral type F,G, and K ($1.5 - 0.7 M_{\odot}$), with few of spectral type M ($<0.7 M_{\odot}$). Since low-mass M stars are the dominant stellar component of the universe (comprising $\sim 75\%$ of all stars), the census of known members in NYMGs is probably incomplete. The under-sampling of low-mass members is a consequence of their low luminosity, wide sky distribution, and a lack of reliable youth indicators in the low-mass regime. NYMG members are important because they provide: 1) Well characterized samples of nearby young stars for study of their physical and kinematic properties and, 2) Prime targets for direct exoplanet imaging.

Therefore I have used a general technique to identify low-mass candidates of NYMGs using proper motion and photometry. Candidates are then screened for secondary evidence of group membership, such as indicators of youth and consistent radial velocity, to identify likely new group members. Here I present results from a northern hemisphere survey of candidates of the β Pictoris (~ 10 Myr) and AB Doradus (~ 70 Myr) NYMGs. The selection technique and follow up observations have identified more than 60 low-mass likely members of these groups with spectral types later than K3. Among the likely new members are many visual binaries and objects that are potentially benchmark young brown dwarfs. The expanded member sample has also allowed for preliminary studies of the astrophysics of young late-type objects including binary properties and spectroscopic gravity indicators and provided new targets for the direct imaging of exoplanets.

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