A deep photometric survey of the double cluster h & χ Per

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Abstract We performed a deep multi-band photometric survey of the central regions of the young ($\sim$13 Myr) and very rich double cluster, h & χ Persei, extending the membership down to the boundary region between stellar and sub-stellar domain ($0.07M_{Sun}$). We used data from CFHT (WIRCAM and MEGACAM) in I, Y, J, H and Ks bands. To select the candidate members we produced CMDs that we compared with the isochrones, and previous known members from photometric, spectroscopical, X-Ray, proper motion, disk and H alpha emission studies. We selected several thousand candidate members in h & χ Persei, down to late M dwarfs in a field of view of 20 by 20 arcmin for each cluster.

h & χ Persei is a young very dense double cluster (e.g., Mayne et al. [1] through pre-main sequence isochrone fitting derived an age of 13 Myr; Currie et al. [2], presented the most complete spectroscopic study of this double cluster 11000 stars, ongoing X-Ray study by Caramazza et al. [3]).

Using data from CFHT (WIRCAM and MEGACAM) in I, Y, J, H and Ks bands and additional known candidate members from other studies (e.g. [2], [3]) we made a candidate member selection based on the BT-Settl isochrone model [4].

To estimate our completeness and saturation levels we compared our observations to the Besançon Galactic Models. To obtain an estimate of the cluster parameters we fitted a King profile [5] to the two clusters simultaneously plus a field contamination, rc and rt are the core radius and tidal radius, respectively. The cluster centre was derived by Bragg and Kenyon [6], because due to saturation of bright stars in the core region we have a limited precision. The area covered by our observations does not allow us to constrain both the tidal radius and the field stars

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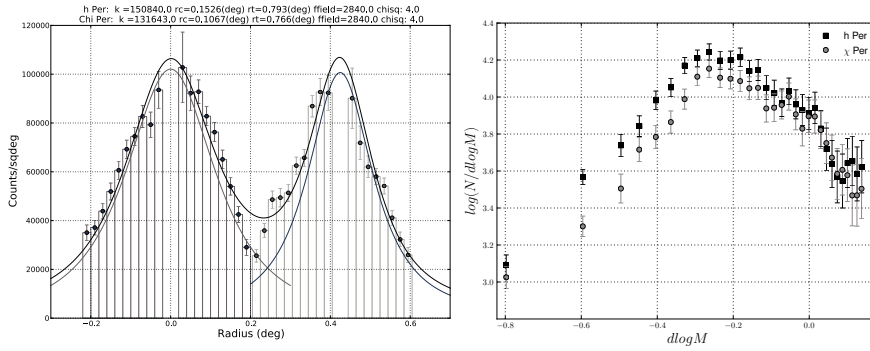LAOG, e-mail: Jerome.Bouvier@obs.ujf-grenoble.fr

Fig. 1 a) Radial star density profile, with the double King profile fitted to the data. h Per on the left and χ Per on the right. The central bins were removed because of incompleteness due to the presence of bright stars in the field. This profile was calculated in a horizontal strip across the centre of the two clusters to minimize the contamination differential due to the presence of the companion cluster. **Fig. 1 b)** h Per (black squares) and χ Per (grey circles) Stellar Mass Function. In our candidate selection we estimate to be complete to $\sim 0.1 \mathrm{M}_{Sun}$

density. We estimated the tidal radius using equation 10 of Pinfield et al. [7], that assumes a circular orbit of the cluster around the Galactic centre, we have taken the cluster mass values from [2]. The estimate of the field contamination derived using the King profile was negligible. So in this preliminary work we will be presenting an uncorrected for field contamination stellar mass function.

With our multi-band photometric study we have selected 16000 candidate cluster members down to brown dwarfs ($\sim 0.06 \mathrm{M}_{Sun}$). We have estimated from King profiles the cluster extent and concentration. We presented preliminary results of the deepest Stellar Mass Function for h & χ Persei down to 0.1 M_{Sun}

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