

**P04a          Deep near-infrared observations of high mass Galactic star forming regions: W3 Main and NGC 7538.**

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We present the deep JHK<sub>s</sub>-band imaging surveys of the two high mass Galactic star forming regions (W3 Main and NGC 7538), using the near-infrared camera SIRIUS (Simultaneous three-color InfraRed Imager for Unbiased Surveys), mounted on the University of Hawaii 2.2 m telescope. The near-infrared surveys cover an area of  $\sim 24$  arcmin<sup>2</sup> each with 10- $\sigma$  limiting magnitudes of  $\sim 19.5$ , 18.4, and 17.3 in J, H, and K<sub>s</sub>-band, respectively. Based on the color-color and color-magnitude diagrams, a rich population of young stellar objects (YSOs) is identified in W3 Main and NGC 7538 star forming regions. A large number of previously unreported red sources ( $H-K > 2$ ) have also been detected around these regions. We argue that these red stars are most probably pre-main sequence stars with intrinsic color excesses. We find that the slopes of the Ks-band luminosity functions of W3 Main and NGC 7538 are lower than the typical values reported for the young embedded clusters. From the slopes of the Ks-band luminosity functions we infer that the W3 Main and NGC 7538 star forming regions are rather young (age  $< 1$  Myr). Based on the comparison between models of pre-main sequence stars with the observed color-magnitude diagrams we find that the stellar population in W3 Main and NGC 7538 is primarily composed of low mass pre-main sequence stars.