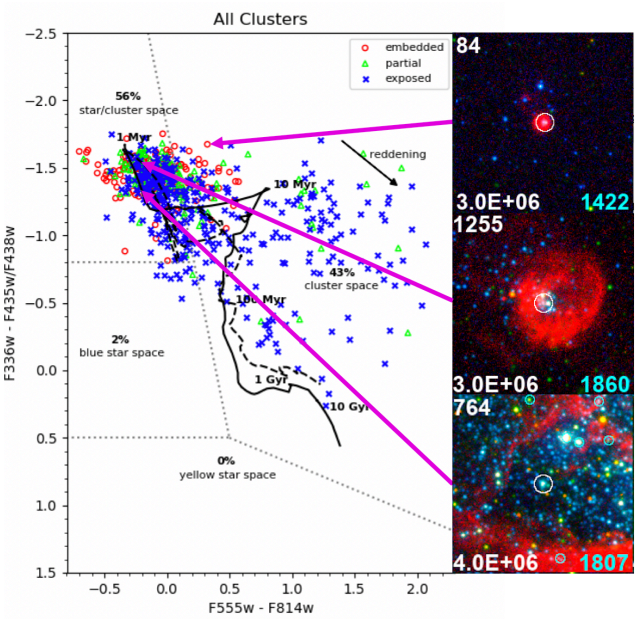
Instituto de Astronomía, sede Ensenada
UNAM, México

Seminario

Miercoles 24 de Octubre, 2018, 11 hrs (PST), Auditorio IA-Ensenada

HII Region Morphologies of Young Star Clusters in 3 Nearby LEGUS Galaxies

Stephen Hannon (Caltech)



The study of H morphology around young star clusters is important for understanding the timescales and thus the physical processes at work in the clearing of a cluster's natal gas. We present an analysis of 660 young clusters (≤10Myr) found in three nearby spiral galaxies (NGC 7793, NGC 4395, and NGC 1313) based on the Hubble Space Telescope (HST) multi-band imaging observations taken as part of the LEGUS survey. Clusters are examined in two parameters: 1) visually classified H morphology stage (embedded, partially embedded, and exposed) and 2) whether they have neighboring clusters, which could affect the clearing timescale of a young cluster. We also present a promising method for quantitatively classifying clusters' stages based on H concentration indices. Through visual inspection of each cluster, age estimation based on their spectral energy distribution (SED), and their position in (U-B) vs (V-I) space, we find the following: the vast majority (87%) of isolated clusters have at least started the clearing process (i.e. are no longer fully embedded) by 4 Myr, in agreement with previous works, while those that are older yet still embedded are of very low mass (<500 solar masses). It is important to note that ~93% of our sample is of low mass clusters (<5000 solar masses) where the initial mass function is not fully sampled and the relationship between physical and photometric properties introduces stochastic effects and therefore may produce less reliable cluster ages. Adding to the uncertainty in the SED age-determinations, we also see that ~40% of exposed, isolated clusters are actually paired with red supergiants, which makes them appear very red in color-color space. In an effort to provide better constraints on the masses and ages, we remove the supergiant pairs and stack the flux of the sources in their respective bins and fields to form 36 composite clusters (6 fields by 6 bins). While stochasticity could certainly be an issue with our low-mass sample, the methods employed provide promising results for application to larger, more massive cluster samples.

Organizadores: Miguel Aragon: maragon@astro.unam.mx, Jesus Hernandez: hernandj@astro.unam.mx